

Storm Water Management Plan

Missouri Department of Transportation



Permit covers: 2017-2021

Submitted by: Eric Schroeter, State Design Engineer
October 16, 2017

Stormwater Management Plan

INTRODUCTION

The Missouri Department of Transportation (MoDOT) developed its first Storm Water Management Plan (SWMP) in July 2006.

The SWMP summarizes MoDOT's intentions to reduce the amount of pollution in storm water runoff from MoDOT's road system by addressing the six categories of concern listed in the MS4 General permit. These categories are as follows:

Public Education and Outreach

Public Involvement and Participation

Illicit Discharge Detection and Elimination

Construction Site Runoff Control

Post-Construction Site Runoff Control

Pollution Prevention/Good House Keeping

As circumstances change, new solutions may be necessary to better control pollution in storm water that flows onto or away from MoDOT's road system. This plan is a continuation in which new and innovative ideas and solutions can be developed in the years to come to protect the water quality of the state's waterways.

MoDOT's TS4 coverage area is a combination of Regulated MS4s, Urbanized Areas, TMDLs where MoDOT has been identified with a waste load allocation (WLA) (4), and Outstanding State and National Resource Waterways ([Exhibit 1](#)).

Included in this stormwater management plan are actions with measurable goals. This is an iterative process of developing a plan, implementing the plan, and evaluating the plan and the process is dynamic, helping MoDOT achieve the goals of the SWMP.

Throughout the SWMP are references to MoDOT's policies and procedures with links to those sites. An appendix is available to the SWMP with those documents upon request.

Stormwater Management Plan

MODOT INFORMATION

Name of Responsible Public Entity:	Missouri Department of Transportation
Name of Person Responsible for the SWMP:	Melissa Scheperle
MS4 coverage area:	In regulated MS4 regulated areas as defined by MDNR, Urbanized Areas, in established or approved TMDLs for MoDOT, in Outstanding State and National Resource Waters.

MoDOT is identified as the continuing authority within MoDOT right of way and properties owned by MoDOT.

Stormwater Management Plan

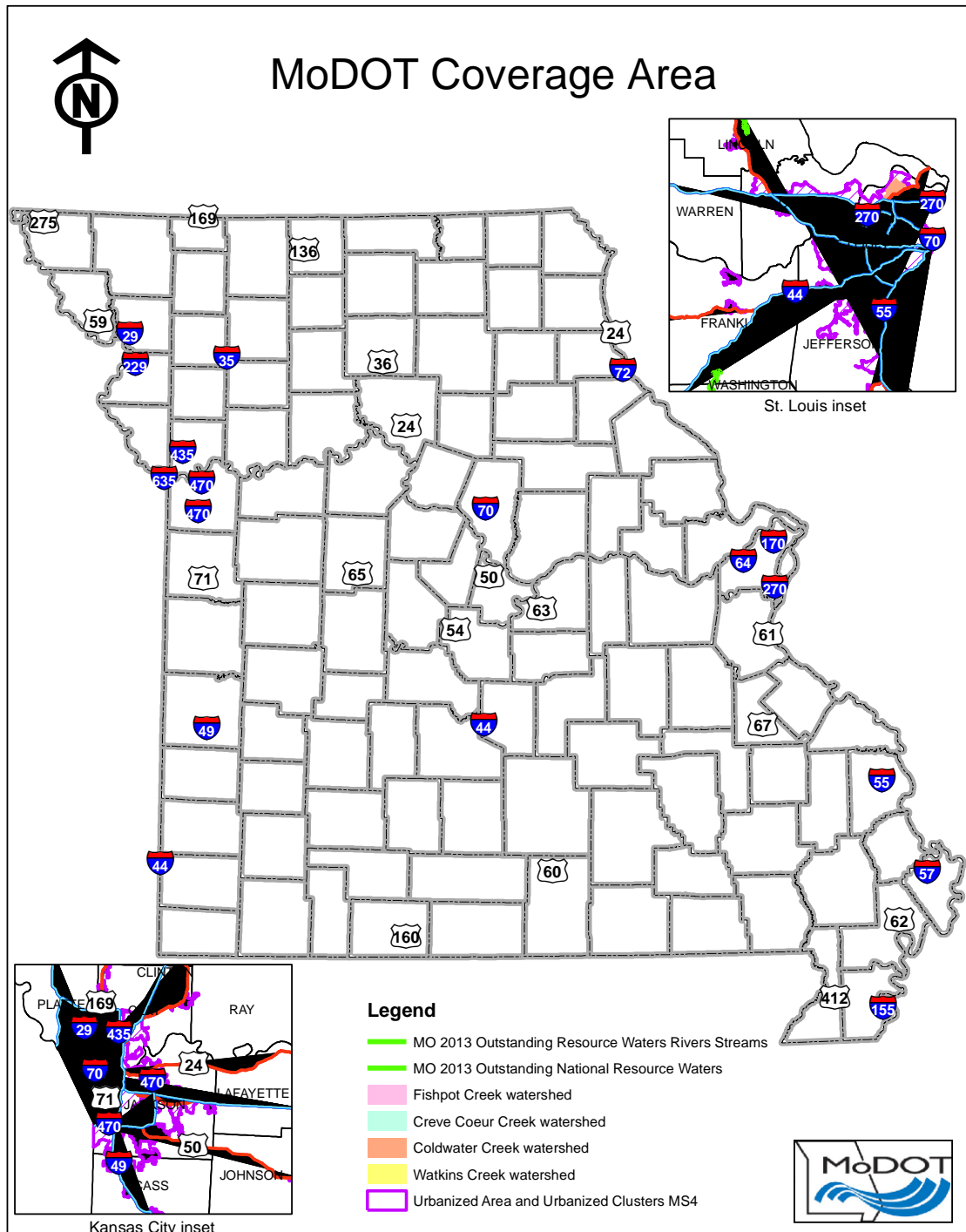


Exhibit 1: Map showing state of Missouri, TS4 area, and major highways.

PUBLIC EDUCATION AND OUTREACH

Through the planning and design phase of its projects, MoDOT holds hundreds of public meetings and hearings around the state each year. While they are primarily held to solicit public opinion on a specific project, those meetings also serve as an excellent way for MoDOT officials to personally respond, one-on-one, to citizen concerns. MoDOT also makes its stormwater brochure available at public meetings to reach out to the public about stormwater.

MoDOT officials also make numerous public appearances, speaking to civic groups, schools, clubs and appearing at other public events. On the Services webpage of the MoDOT home webpage, anyone can request a public speaker by topic or region (<http://www.modot.org/requestaspeaker>).

MoDOT also makes extensive use of the media to communicate with the public. These contacts include news releases, twitter, facebook (over 8,600 followers), radio, e-mail, telephone and written correspondence. MoDOT has also made strides toward communicating directly with the public through a bi-monthly electronic newsletter, *ExpressLane*. The distribution list for the newsletter, which debuted in October 2005, has climbed to over 34,000 subscribers.



Figure 1: 12-29-16 Facebook post.

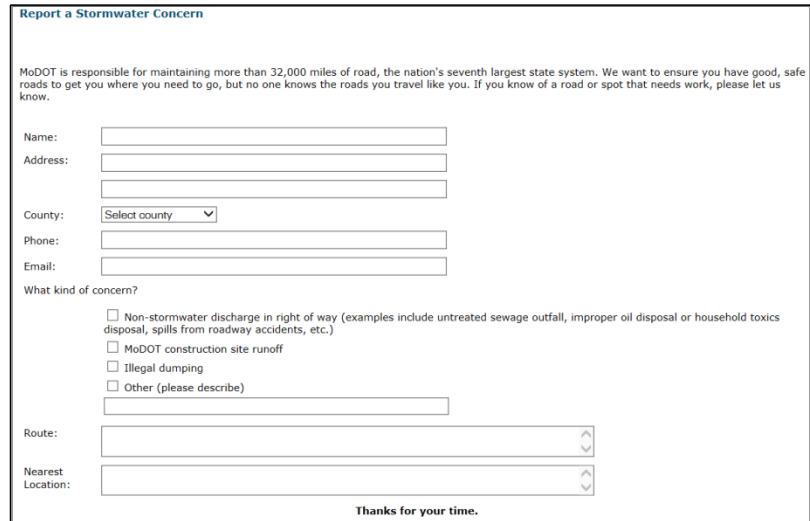
MoDOT has also made a commitment to making its website – www.modot.mo.gov – an outreach tool and information repository for its customers. Users engage in approximately 225,000 sessions per month on the site, with 39 percent of those customers returning more than once (January 2017). The percentage of repeat visitors has been climbing steadily since MoDOT began tracking the activity in January of 2005 and added interactive features like the Traveler Information map.

More specifically, MoDOT has a *Report a Stormwater Concern* form that encourages the public to report concerns related to stormwater including

non-stormwater discharges on right of way, construction site runoff, illegal dumping and “other” concerns.

Stormwater Management Plan

Action: MoDOT will educate the general public and MoDOT community on storm water issues primarily related to sediment and litter as it relates to the state's highway system through public meetings, public events, website, email and use of media and materials. MoDOT will continue the same level of effort to reach as many persons as in the previous year through all of the above mechanisms, and will use outreach tools to explain storm water quality issues.



Report a Stormwater Concern

MoDOT is responsible for maintaining more than 32,000 miles of road, the nation's seventh largest state system. We want to ensure you have good, safe roads to get you where you need to go, but no one knows the roads you travel like you. If you know of a road or spot that needs work, please let us know.

Name:

Address:

County:

Phone:

Email:

What kind of concern?

☐ Non-stormwater discharge in right of way (examples include untreated sewage outfall, improper oil disposal or household toxics disposal, spills from roadway accidents, etc.)

☐ MoDOT construction site runoff

☐ Illegal dumping

☐ Other (please describe)

Route:

Nearest Location:

Thanks for your time.

Figure 2: MoDOT Report a Stormwater Concern form.

Measurable Goal - MoDOT will track how many visitors have used our storm water webpage (www.modot.org/stormwater) and content on the webpage each year and continually update the page with the best available information on MoDOT's role as a TS4.

Measurable Goal – MoDOT will track use of its stormwater email (stormwater@modot.mo.gov).

Measurable Goal - MoDOT will track how many visitors have used/submitted the Report a Stormwater Concern form and how many of those were related to permit measures.

Measurable Goal - MoDOT will track how many stormwater brochures are disseminated each year in each district.

Measurable Goal – MoDOT will track and report on education components related to litter prevention through its participation in No More Trash events statewide and other media outlets.

Measurable Goal - MoDOT will continue to participate in events such as Earth Day and the State Fair. MoDOT will track participation in these events.



Figure 3: Facebook post 1/30/17.

PUBLIC INVOLVEMENT AND PARTICIPATION

MoDOT is committed to involving the public, local officials, transportation stakeholders and other interested parties in the process of evaluating needs, selecting projects and defining the work to be done. The department goes beyond federal guidelines to create a transportation system that is safe, efficient and enjoyable. A transparent planning process helps minimize the impact a project could otherwise have on the natural, social and economic environments.

MoDOT's commitment of involving the public in the transportation decision-making process and to reaching out to its customers about its programs and projects is in keeping with the department's mission: "...to provide a world-class transportation experience that delights our customers and promotes a prosperous Missouri."

Public involvement and outreach also support MoDOT's values that are measured through a series of tangible results that are the key component of *The Tracker*, MoDOT's performance-based system that is documented quarterly. *Tracker* is focused on the customer and measures MoDOT's performance in giving customers what they want, such as "provide outstanding customer service;" and "use resources wisely," just to name a few.

Those values are:

MoDOT will ...

- Be Safe,
- Be Accountable,
- Be Respectful,
- Be Inclusive,
- Be Bold,
- Be Better, and
- Be One Team

So we can be a great organization.

To reach out to the public, and to be responsive to its needs, MoDOT uses many tools and techniques. Each of these is implemented on statewide and local levels through the department's community relations offices at the Central Office in Jefferson City and the department's 7 district offices. A customer service center is also maintained at each location. MoDOT's policy regarding public involvement and stormwater can be found in the [EPG Section 129](#).

MoDOT tracks the number of customers who contact MoDOT via email, telephone or letter.

Stormwater Management Plan

Action: Through the above mechanisms, MoDOT will collect and respond to public comments and concerns on water quality issues related to storm water management as it relates to expansion or operation and maintenance of the state's highway system.

Measurable Goal: MoDOT will report how many individuals are involved in programs MoDOT offers related to the TS4 permit including events like No More Trash Bash, Trees for Tomorrow, adopt a highway and sponsor a highway programs.

Action: MoDOT will continue a program to facilitate the public reporting of illicit discharges, including dumping, by providing a venue for the public to submit concerns to MoDOT.

Measurable Goals: MoDOT will report yearly how many visitors have submitted the Report a Stormwater Concern form and how many of those were related to permit components on MoDOT right-of-way or facilities.

Measurable Goal: Additionally, MoDOT will report how many reports came from internal personnel or other methods.

Action: MoDOT will continue to promote public awareness campaigns through the website and other media outlets.

Measurable Goal: MoDOT will report annually how many of these types of events were carried out.



Figure 4: February 3, 2017 *No More Trash* booth at Missouri Natural Resources Conference.

Measurable Goal: MoDOT will report how many times it used media to promote awareness of stormwater issues.

Action: MoDOT will continue to participate in watershed activities and coordination with other MS4 communities when appropriate including the Hinkson Creek Collaborative Adaptive Management (CAM) -Action Team.

Measurable Goal - MoDOT will report annually how many times MoDOT collaborated with other MS4s.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

MoDOT has a program to educate MoDOT employees regarding proper management and disposal of toxic materials or illicit discharges discovered on the right of way. The training is required annually of maintenance employees either as full training or refresher training.

Outfalls

Nearly every MoDOT highway includes one or two drainage ditches that carry runoff water to the nearest down gradient water body at the location of a crossroad culvert or bridge. In some cases the parallel MoDOT ditch may discharge to a drainage swale that simply flows away from the right of way in the direction of a nearby water body. In addition, MoDOT's bridges may have numerous outfalls called bridge drains where drainage comes off the bridge and discharges to the waterbody.

MoDOT has used resources available, GIS data, to provide a UTM point where MoDOT's outfalls intersect a water of the state. Outfalls are mapped using handheld GPS or aerial photography where intentionally concentrated flow (i.e. ditches) intersects waters of the State. Waters of the State are determined to be those streams with designated uses, aka Classified streams, by MDNR (GIS layer obtained from MSDIS). Where bridges cross Classified streams and have more than one bridge drain, one location in the center of the bridge is taken to account for the many. If other outfalls are located at the bridge in the form of ditches, those are taken as separate outfalls. UTM locations of these can be provided upon request.

MoDOT outfalls are inspected as part of normal activities and routine bridge inspections. Location and inspection information is maintained in MoDOT's Transportation Management System (TMS) database.



Figure 5: Outfall to a tributary to Creve Coeur Creek.

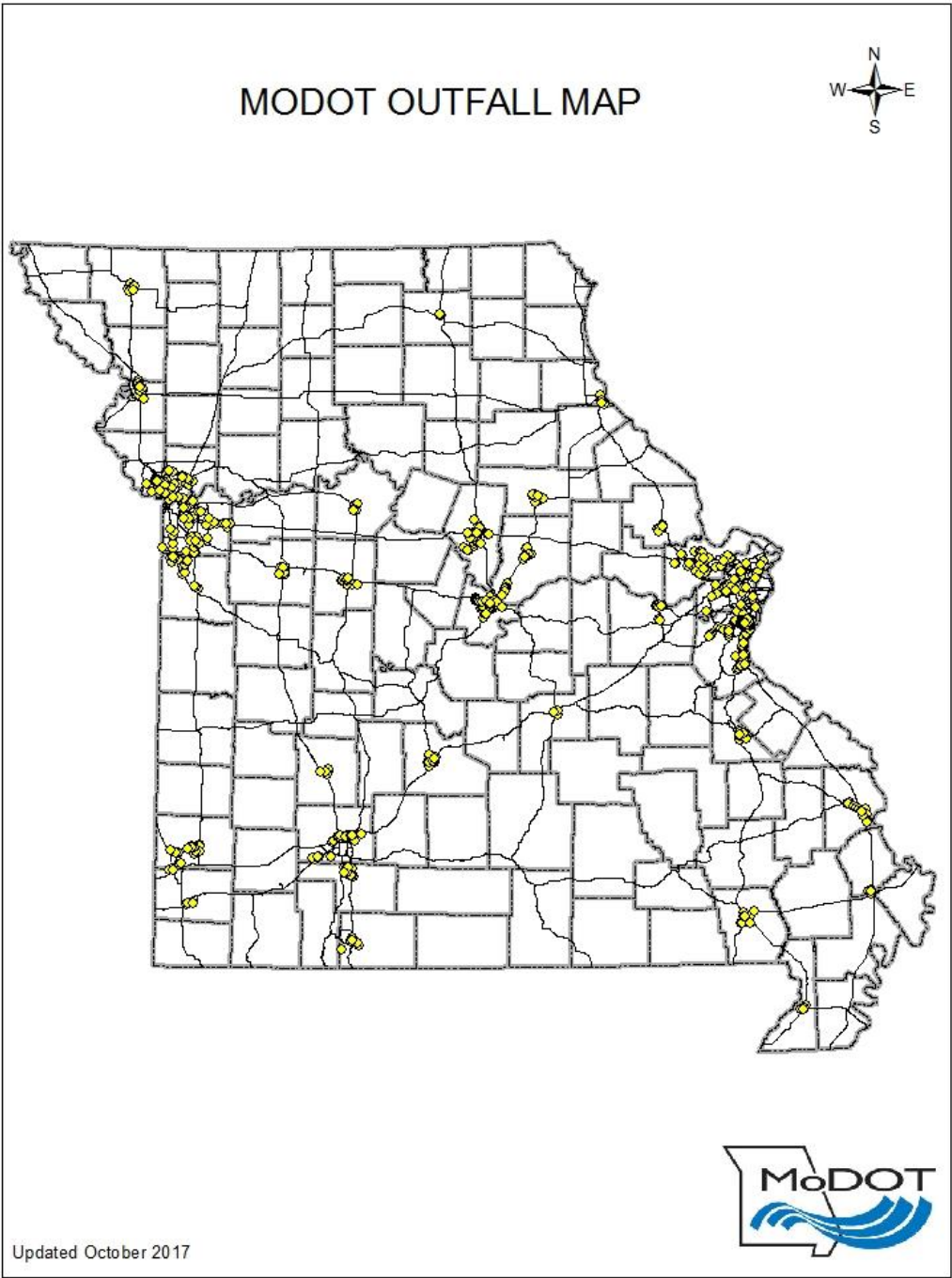


Exhibit 2: MoDOT Outfalls (2,182) as of October 2017.

Discovery of IDDE's

MoDOT currently has a process in place to detect and eliminate illicit discharges but does not possess the legal authority under state law to prevent illicit discharges and improper disposal of waste or wastewater. Case law has, in fact, established precedent in this area. Therefore, as part of that process, unpermitted discharges are referred to the appropriate regulatory authority for follow-up. MoDOT will perform a preliminary investigation of any illicit discharges, to the extent allowed by MoDOT's authority, prior to notifying the existing regulatory authority.

127.25.8.3.1 Industrial and Domestic Waste Waters on Right of Way

Sewage and waste shall be disposed of by discharging into a sewer system regulated pursuant to chapter 644, RSMo, or shall be disposed of by discharging into an on-site sewage disposal system operated as defined by rules promulgated pursuant to sections 701.025 to 701.059, RSMo. Any person installing on-site sewage disposal systems shall be registered to do so by the [Missouri Department of Health and Senior Services](#).

Private homeowners are regulated by the Missouri Department of Health and Senior Services. The Missouri Department of Health and Senior Services is to be contacted when wastewater discharge from private homeowners is found on right of way. If a property owner requires assistance in containing effluent, they should be directed to the Department of Health for assistance.

Commercial businesses and industries are regulated by [MDNR](#). When wastewater discharge from a regulated entity is discovered on MoDOT right of way, the Environmental Specialist will contact MDNR to determine if the commercial business or industry has a valid operating permit issued by MDNR to discharge effluent.

The Environmental Specialist will request MDNR to take whatever legal action necessary concerning any business or industry that does not have a valid permit from MDNR to discharge effluent to the highway right of way.

For additional information see [EPG 127.25.3.1 Rest Area Lagoon](#), [EPG 127.25.8.3 Sewage Disposal System](#), and [EPG 127.25.8.3.2 System Attachments by Others](#).

Reason for Policy: [RSMo. 701](#)

Effective Dates: 6/1/99

Revision Dates: 12/27/12

127.25.8.3.2 System Attachments by Others

MoDOT's policy, under the Engineering Policy Guide (EPG) [127.25.8.3](#), outlines how discoveries of illegal effluents will be handled. MoDOT will contact the local departments of health when the presence of wastewater is present or the Missouri Department of Natural Resources for all other discharges.

Figure 6: Engineering Policy Guide 127.25.8.3.1.

Public reporting of the presence of illicit discharges or water quality impacts associated with storm water discharges is possible by contacting any of MoDOT's Customer Service Centers, Central Office, or MoDOT's website including the Report a Stormwater Concern form.

Trash as an IDDE

MoDOT has an Adopt-A-Highway program, where volunteer groups periodically pick up the trash and debris along the sides of state highways. See MCM 2, [Public Involvement and Participation](#), for details.

Other Occasional, Non-Stormwater Discharges

Bridge washing, cleaning and flushing is a relatively common non-stormwater discharge that occurs when necessary for construction and maintenance activities. Preventative maintenance can extend the life of a bridge by retarding the rate of deterioration of bridge components. Spraying of water on bridges is also used to remove inactive bird nests prior to work on the structure. MoDOT



Figure 7: Street sweeping and bridge washing.

has guidance for this activity in regard to spread of zebra mussels and rock snot. All state and federal requirements are met when accomplishing this task ([EPG: 771.2 Bridge Cleaning and Flushing](#)).

Action: MoDOT will continue a program to facilitate the public reporting of illicit discharges, including dumping, by providing a venue for the public to submit concerns to MoDOT and then forwarding

confirmed instances to the proper authorities. Hazardous material spills will be reported within 24 hours upon discovery and will be made to the Missouri Department of Natural Resources (MDNR) Environmental Emergency Response (EER) – 573-634-2436 – in accordance with MoDOT procedures and Missouri [RSMo 260.500 through 260.555](#).

Measurable Goal: MoDOT will report how many illicit discharge reports are received and investigated using information obtained through the website reporting form and by MoDOT staff.

Measurable Goal: MoDOT will report how many spills on right of way were reported to MDNR's EER System, including vehicular accidents. Vehicular accidents are included because it is generally impossible to determine from the reports whether the spill reached a waterway. Cleanup is generally directed by MDNR, MoDOT, or Highway Patrol.

Action: MoDOT will educate and cross-train maintenance staff to assist with identification of illicit discharges on MoDOT right of way.

Measurable Goal: MoDOT will report how many staff were educated on identification of illicit discharges that discharge into the MoDOT drainage system at least once annually through regular training or the refresher training.

Action: MoDOT will continually inspect, through daily work and routine maintenance, the outfalls on MoDOT's system.

Measurable Goal: MoDOT will report how many bridges have been inspected annually.

CONSTRUCTION SITE RUNOFF CONTROL

Stormwater Permits

Provisions of the federal Clean Water Act and related state rules and regulations require storm water permits where construction activities disturb one acre or greater over the life of a project as part of a common plan or sale. MoDOT has a general permit, obtained from the Missouri Department of Natural Resources (MDNR), which authorizes the discharge of stormwater from its road construction activities and the associated land disturbance. The permit stipulates that MoDOT will follow certain erosion and sediment control guidelines and install temporary erosion control measures. Locally sponsored federal aid projects that are performed on MoDOT right of way and are using MoDOT's land disturbance permit are required to comply with MoDOT Standard Specifications, and therefore, must follow the Storm Water Pollution Prevention Plan (SWPPP). Cities, counties and other government entities may already possess their own National Pollutant Discharge Elimination System (NPDES) permit and, in that case, must comply with their own SWPPP.

Design Considerations

MoDOT has provided a few guidelines for the development of erosion and sediment control plans. First the designer is responsible for the plans and therefore should develop the erosion control plan during the design phase. The designer shall also evaluate the proposed construction site to determine sensitive areas and features that could be potential erosion hazards. Once this information has been reviewed and all necessary data is obtained, the following recommended guidelines should be followed:

- Determine limits of clearing and grading.
- Divide the site into drainage areas.
- Divert clean runoff around the construction area.
- Erosion and sediment controls shall be used whenever possible to reduce erosion at the site and prevent offsite damage.

As part of the storm water control measures, the contractor shall take certain management measures into consideration when preparing a work schedule. Such contractor measures include, but are not limited to:

- Install appropriate perimeter erosion control measures prior to grading.
- Sequence and stage construction so that no area remains exposed for unnecessarily long periods of time, and disturbed areas should be stabilized before other areas are disturbed.
- Stabilization Best Management Practices (BMPs) should be implemented as soon as practical after grading.

Stormwater Management Plan

- Develop and carry out a regular maintenance schedule for erosion and sediment control practices.
- Utilize spill prevention and containment measures at storage sites.
- Develop and follow a plan for regular collection and disposal of waste material as well as designate a site for disposal.
- Designate the responsibility for implementing and maintaining the erosion and sediment control measures to one person.

Erosion, sediment and pollution control, and storm water management will be a priority discussion point at all appropriate project pre-construction conferences. Monitoring and inspection of the features of the erosion control plans will be carried out and documented by the resident engineer for the construction project. Any items of concern regarding BMPs should be brought to the attention of the contractor for correction.

Construction Requirements

The Resident Engineer will limit the surface area of erodible earth material exposed by clearing and grubbing, or excavation, borrow and fill operations, and may direct the contractor to provide immediate permanent or temporary erosion control measures to prevent contamination of adjacent streams or other watercourses, wetlands, lakes, ponds and other water impoundments.

The contractor shall be required to incorporate all permanent erosion control measures into the project at the earliest practicable time. Temporary sediment control measures shall be used to correct conditions that develop during construction which were not foreseen during the design stage. Temporary sediment control shall also be used prior to installation of permanent control measures when needed.

Perimeter controls shall be installed prior to scheduled clearing and grubbing operations and performed so that temporary and permanent erosion control measures will follow immediately thereafter. The surface area of erodible earth material exposed at one time by clearing and grubbing, by excavating, by fill or by borrow, shall be minimized to prevent runoff. The engineer may limit the total acreage of erodible earth material to be exposed at one time as determined by an analysis of project conditions, or identify specific BMPs and controls that must be installed in order to exceed the specified maximum disturbed acreage threshold.

Unless otherwise approved, construction operations in rivers, streams, wetlands and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures. Rivers, streams, wetlands and impoundments shall be promptly cleared of all false work, piling, debris or other obstructions placed therein or caused by the construction

Stormwater Management Plan

operations. Frequent fording of live streams or wetlands with construction equipment is not permitted.

Site-specific erosion and sediment controls shall be discussed with the contractor at a preconstruction conference. Special conditions may be developed which can include limitations on the amount of surface area that can remain unprotected at one time or special water quality or stream protection requirements.

In the event of a conflict between these requirements and pollution control laws, rules, or regulations of other federal, state or local agencies, the more restrictive laws, rules or regulations shall apply.

Control Measures (SWPPP)

MoDOT has prepared a Storm Water Pollution Prevention Plan ([SWPPP](#)) that has been provided to all construction offices as part of each construction contract. The SWPPP describes several BMPs that may be used to control runoff from land disturbance activities of one acre or more. The following BMPs may be used together or separately in order to ensure that contaminants do not leave MoDOT right of way.

Temporary Controls

Temporary water pollution control measures are required on all contracts awarded by MoDOT. The contractor shall exercise best management practices throughout the project to ensure that contaminants do



no leave MoDOT right-a- way. This work shall consist of furnishing, installing, maintaining and removing temporary control measures as shown on erosion control plans or as ordered by the engineer. The control of water pollutants will be accomplished through the use of berms, slope drains, ditch checks, erosion control blankets, sediment basins, temporary seeding and mulching, silt fences and other erosion control devices or methods. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage or other harmful materials shall not be discharged from the project. No work shall be

Figure 8: Construction project in Perry County, 2017.

Stormwater Management Plan

started until the erosion control timetable and methods of operation have been approved.

Temporary erosion and sediment control measures shall be coordinated with permanent erosion control measures to assure economical, effective and continuous erosion control. Temporary erosion and sediment controls shall be kept in place and maintained until vegetation has achieved a state of final stabilization as defined as 70% seed growth over 100% of the project area. The engineer shall routinely inspect the condition of erosion controls and shall notify the contractor immediately if any controls are found to be in disrepair or are not functioning at the desired level of effectiveness. Inspection records and directives to the contractor shall be noted in the inspector's Project Records, which shall be available for review by Missouri Department of Natural Resources (MDNR) upon request. Temporary Measures include:

- Temporary Berms (Type A, Type B, Type C)
- Temporary Slope Drains
- Ditch Checks (Type 1, Type 2)
- Sediment Traps
- Temporary Seeding
- Temporary Mulching
- Silt Fence
- Surface Roughening
- Mulching and Crimping
- Brush Piles
- Sediment Basins

Permanent Controls

The contractor shall be required to incorporate all permanent erosion control measures into the project at the earliest practicable time. Permanent Measures include:

- Sediment Basins
- Sediment traps
- Permanent Seed and Mulch
- Type C Berms
- Rock Blanket
- Rock Ditch Checks

Erosion and Sediment Inspections

Erosion Control Inspection Records and an inspection report log are required for projects with one acre or more of total land disturbance. All disturbed areas and installed Best Management Practice items (BMPs) are inspected for proper

Stormwater Management Plan

location, installation, operation and maintenance. Points of stormwater egress are inspected for evidence of erosion or sedimentation.

Reports are required within seven calendar days of a previous inspection or within 48 hours of any reportable precipitation event.

The report is to be signed by the MoDOT representative who performed the inspection. Information required on the form includes:

- 1) Contract/Job identification number;
- 2) County and Route location;
- 3) Name of MoDOT inspector completing report;
- 4) Date of inspection;
- 5) Areas requiring installation of new BMPs;
- 6) Existing BMPs requiring corrective action;
- 7) Corrective actions taken on previously listed deficiencies;
- 8) Areas where land disturbance operations have temporarily or permanently ceased.

The contractor's Erosion Control Supervisor receives a copy of each week's report for prompt corrective action, if necessary.

Audits and Training

MoDOT has assigned one employee the responsibility of performing statewide audits of construction sites to ensure that SWPPPs are being followed to the extent that off-site contamination does not occur. The individual usually will visit every construction site at least once per year and meet with MoDOT resident engineers, inspectors or contractors to evaluate the land disturbance elements of the project.

MoDOT shall continue to require training for construction inspectors, resident engineers and other personnel. It is anticipated that such training shall continue through the annual Environmental Compliance class, currently held routinely at each of the seven MoDOT districts. The Environmental Compliance class has also been delivered and is available to contractors and other private or public organizations as requested. Training may also occur on a less formal basis as deemed necessary by MoDOT.

Contractor Compliance

MoDOT has the authority to stop work on any construction job when the contractor does not perform work in compliance with contract provisions. In cases where the contractor is causing water quality problems, or creates conditions with the potential to contaminate waters of the state, the engineer will take appropriate disciplinary action to ensure proper control measures are in

Stormwater Management Plan

place. Actions possible include: issuance of an Order Record (this is a non-compliance notification that negatively affects a contractor's performance rating; a poor rating could result in removal from the list of MoDOT approved contractors), suspension of payments to the contractor, or suspension of work on the project.

Contractors are evaluated on project performance each year. One of the elements of the Performance Rating system involves erosion control compliance. Low ratings may cause disciplinary action to be taken against poorly performing contractors. Disciplinary actions range from being placed in a probationary status to disqualification from bidding on MoDOT construction contracts for a period of three years.

Protection of Streams, Lakes, Ponds, and Reservoirs

In compliance with the Missouri Clean Water Law (Section 644.051), neither MoDOT nor MoDOT's contractors shall pollute any waters of the state, or place, cause, or permit to be placed any water contaminant in a location where it is reasonably certain to cause pollution of any waters of the state. Also, they shall not discharge water contaminants into any waters of the state, which reduce the quality of these waters below the state's water quality standards. These water quality standards include the following ([MO10 CSR 20-7](#)):

- (a) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.*
- (b) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.*
- (c) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.*
- (d) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.*
- (e) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.*
- (f) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200–260.247.*

MoDOT personnel or contractors performing work for MoDOT shall comply with these and any other federal, state and local laws and regulations that serve to control pollution of the environment. To ensure that these general criteria are

Stormwater Management Plan

met, the following guidelines from the MOU with MDNR dated September 8, 2009, will be observed:

- 1) *During construction, clearing of vegetation will be kept to the minimum necessary to accomplish the project.*
- 2) *Petroleum products, hazardous chemicals, hazardous wastes, equipment and solid waste will not be stored after construction working hours below the ordinary high water mark.*
- 3) *Equipment will not be operated in wetlands areas, except where permitted, expressed by the project plans or the engineer in writing. Petroleum products will not be stored in wetlands.*
- 4) *Riparian areas and stream banks will be restored to a stable condition as soon as possible after final contouring.*
- 5) *Work done in streams shall be conducted during low flows whenever that is reasonably possible.*
- 6) *Petroleum products spilled into any stream or body of water or in areas where those materials could enter a stream or body of water will be cleaned up immediately and the collected petroleum products shall be disposed of properly.*
- 7) *The following materials will not be used for stream bank stabilization: earthen fill, gravel, fragmented asphalt, broken concrete with exposed rebar, large slabs of unbroken concrete, tires, vehicle bodies, liquid concrete, including grouted riprap.*

Action: Continue training of MoDOT personnel through an annual Consent Decree training and Erosion and Sediment Control Training. MoDOT continues to conduct annual training of its design, construction and maintenance employees and contractors and consultants to ensure implementation of the SWPPP and compliance with the Land Disturbance permit.

- ⇒ MoDOT has training material (2014 Land Disturbance Refresher Course as well as the 2012 Land Disturbance Full Course) posted in three locations for ease of use to employees and contractor/consultants. The 2014 Land Disturbance Full Course is available in these same locations as well.
 - EPG: [806.8 Storm Water Pollution Prevention Plan \(SWPPP\)](#) - In the box on the right, under "Additional Information".
 - Construction and Materials (CM) Intranet, under "Erosion Control".
 - MoDOT Internet: http://www.modot.org/business/contractor_resources/LandDi

Stormwater Management Plan

[sturbanceltems.htm](#) - for MoDOT land disturbance items as a resource for contractors and consultants.

Measurable Goal: MoDOT will report how many MoDOT employees and how many non-MoDOT employees have taken the training classes.

Action: Perform statewide audits of construction sites to ensure that specifications and SWPPP are being followed. In addition to site inspections conducted weekly and following significant rainfall events, MoDOT continues to conduct quality control audits of each project covered by the Land Disturbance permit. These audits are generally conducted at a minimum once a year per construction site to ensure consistent inspections and implementation of the SWPPP.

Measurable Goal: Evaluate erosion control elements of 90% of all land disturbance sites that involve 1 acre or more of land disturbance and report how many were done annually.

Action: Continue Contractor Performance Rating System for project to measure or recognize contractors' outstanding performance as well as those being disciplined for less than satisfactory performance. Disciplinary action results from unacceptable rating in the categories of quality, prosecution & progress, contract compliance, and overall. The contractor performance questionnaire (see attached) includes a section of six questions related to Section 800, Roadside Development to rate the contractor on items such as seeding, erosion inspection reports, correction of deficiencies within the 7-day requirement, etc. For more information refer to [EPG 102.2](#)

Measurable Goal: Utilize the existing performance rating system to notify contractors when erosion control elements of the project are less than desirable as determined by elements of the SWPPP yearly per project. A numeric goal is not desirable for this action due to the sensitive nature of the process of evaluating contractors. From [EPG 102.2.1](#)-The reporting period for the annual performance project evaluation is the calendar year, January 1 through December 31 with the report for each active project due on February 1 of the following year. Final reports on projects completed during the calendar year are due 30 days after project acceptance. From [EPG 102.2.7](#)-The resident engineer must discuss performance with the contractor. If performance deficiencies exist, the contractor needs the time during the remainder of the season to provide the opportunity to improve their ratings for the year. The department does not want a contractor disciplined at the end of a construction season without assurances efforts were made to timely communicate any poor performance. It is not MoDOT's intent or desire to disqualify contractors but it must insist on quality construction and timely completion of projects.

Action: MoDOT will continue to advance personnel knowledge of state of the art practices and policies by attending events and conferences.

Measurable Goal: At least one annually.

POST-CONSTRUCTION SITE RUNOFF CONTROL

MoDOT will consider additional New Development and Redevelopment Program requirements as MoDOT projects are initiated. The evaluation shall consider comprehensive planning procedures and controls to reduce the discharge of pollutants after construction is complete, from areas of new highway development and significant redevelopment and associated drainages. The program will consider non-highway facilities that would prevent or minimize water quality impacts. This program does not apply to normal maintenance activities.

MoDOT shall continue to implement a program that ensures that new highway projects and significant highway modifications are reviewed for the need to include permanent storm water BMPs, and the results from that review implemented. As part of the program, MoDOT will define as “significant,” highway modifications that disturb greater than or equal to one acre, are inside the TS4 coverage area and fall under the definitions of new development or redevelopment that MoDOT has developed.



Figure 9: Permanent detention basin on Route 141 and Big Bend Rd.

Additionally, MoDOT shall put preference on particular types of BMPs whenever projects have the potential to discharge to watersheds where a total maximum daily load (TMDL) has been developed and includes a wasteload allocation (WLA) for MoDOT.

MoDOT will evaluate BMPs, as part of the iterative process, as part of the annual reporting process. This includes evaluating existing procedures for ensuring long-term

maintenance and operation of permanent BMPs and determining whether a need exists to improve that process.

Additionally, under [EPG 748.1.2](#) Hydraulic Impacts of Roadway, MoDOT design evaluates the hydrologic and hydraulic impacts to the roadway and surrounding

Stormwater Management Plan

properties. MoDOT is better able to mimic the pre-construction runoff quality in new development and to the MEP in redevelopment projects by evaluating how significant an increase is for a project regarding peak flows and therefore mitigation through detention storage or other various measures.

748.1.2 Hydrologic Impacts of Roadway

Development such as a highway project can affect the hydrologic characteristics of a watershed. Such development typically increases the amount of impervious area within the watershed, and may also decrease the time of concentration of the watershed. Both of these effects tend to increase both the volume and peak rate of runoff from the watershed. The magnitude of this increase is generally dependent on the ratio of the developed area (pavement and right of way in the case of highway projects) to the total watershed drainage area. When the developed area is a large percentage of the total drainage area, the impacts can be significant. The degree of hydrologic impact shall be subjectively evaluated for all highway projects; when the impacts are estimated to be of concern, a detailed analysis shall be performed. Significant increases in peak flow rates shall be mitigated through the use of detention storage or other appropriate measures.

Figure 10: EPG 748.1.2

Action: Create a Stormwater Team to assist in development of policy regarding post-construction bmps and other MCMs. MoDOT's stormwater team is made up of construction, maintenance, design, and environmental personnel to assist in development of policies.

Measurable Goal: Report policy changes or additions in the reporting cycle.

Action: Train MoDOT personnel to consider post-construction BMPs where required by policy definitions of new development and redevelopment in the STIP process. Proceed through the process of tracking and officially inspecting permanent BMPs on an every other year basis. They are inspected regularly during routine maintenance activities.

Measurable Goal: Report how many projects were evaluated in the reporting cycle.

Measurable Goal: The number of post-construction bmps constructed during the reporting cycle.

Measurable Goal: How many BMPs are inspected during the reporting cycle and if any fail inspection.

Measureable Goal: Train design staff at least every other year and report how many where trained in the reporting cycle.

Action: MoDOT's system crosses other regulated MS4s. Coordination and partnering with other MS4 communities provides opportunities to work together to facilitate compliance with like goals.

Stormwater Management Plan

Measureable Goal: MoDOT will report what types and how many coordination events are occurring.

Pollution Prevention/Good House Keeping

Roadway maintenance activities conducted by district maintenance forces, that impact storm water quality include: snow and ice control on state and interstate highways, roadway surface maintenance, roadside facility maintenance, roadway appearance, and tunnel maintenance.

Cities and counties perform the maintenance work on some state roadways for MoDOT. This is accomplished through a formal maintenance agreement signed by the Missouri Highways and Transportation Commission and the city or county. The maintenance agreements contain standard requirements that the city or county maintain the facilities in accordance with Commission-approved standards.

The following manuals are to be used for maintenance of roadway facilities. Most manuals can be found in the Engineering Policy Guide:

1. Maintenance Division Policy Manual – [EPG 171: Maintenance Policy and Operations.](#)
2. Roadside Vegetation Management Manual – [EPG 171.6.4: Vegetation Management.](#)
3. Herbicide Manual – [EPG 821: Herbicides and Roadsides.](#)
4. Maintenance Function Planning Guidelines – [EPG 822: Maintenance Planning Guidelines for Mowing Operations.](#)
5. Preventive Maintenance Guidelines for Bridges – [EPG 171.7 Bridge Maintenance.](#)
6. Operator's Guide for Anti-Icing – [EPG 133: Snow and Ice Control.](#)
7. [Missouri Standard Specifications for Highway Construction.](#)

Structure Maintenance

MoDOT drainage facilities such as detention ponds, storm drains, inlets and catch basins are inspected on an as-needed basis. In all areas a close inspection of problematic storm drain inlets (selected inlets known to flood) occurs during rainstorms or if complaints are received to ensure proper operation. Documentation pertaining to the inspections is limited and may normally contain only the date and time of the inspection. Each district currently inspects water drainage facilities (retention ponds and other structures) on an as-needed basis to ensure that the facility operates as designed. The frequency of inspection can vary depending on the design of the structures.

Currently, MoDOT has not located all of its structural controls. Approximately 50% have been located and MoDOT will continue to work on this task throughout

Stormwater Management Plan

the 5 year permit cycle with the goal of 100% at the end of the permit cycle. Location of major structural controls (primarily large detention basins) and formal permit-based inspections are stored in the Transportation Management System (TMS) database.

Ditches

All open ditches are to be maintained to preserve their full depth and cross section. Surplus material from ditch cleaning is used in other tasks such as widening shoulders and fills, repairing erosion and filling wash outs. Where appropriate or necessary, maintenance occurs on ditches and waterways as needed.

Street Sweeping

Mechanical sweeping of sand, dirt and debris from paved surfaces, shoulders, curbs and gutters and median barriers is performed to assure roadway drainage. Sweeping maintains the environmental and aesthetic quality of the roadway, and is accomplished to eliminate safety concerns. Sweeping is MoDOT's responsibility on Interstate Highways, National Highway System Routes and Commission-owned roadways within the state highway system unless covered by a maintenance agreement ([EPG 127.25.1.4](#)). Street sweepings may either be disposed of in a permitted sanitary landfill or can be reused as established by MDNR. In order to be reused the sweepings are processed or screened to remove trash, litter and other debris. The sweepings then must be tested as required by MDNR. Protocol for sampling and guidance is provided in the EPG link above.

Snow and Ice Control

One of MoDOT's high priorities is the removal of snow from state highways. Anti-icing operations to prevent the formation or development of packed and bonded snow or bonded ice to the pavement surface is the first priority on continuous treatment routes during a winter weather event. Snow and ice control operations begin as soon as weather conditions warrant and continue on a 24-hour-per-day basis until all objectives outlined in the Snow and Ice Control Operations policy ([EPG 133.4](#)). The removal of snow and ice from the roadway and the application of abrasives or de-icing products take precedence over all other maintenance work. MoDOT's Operator's Guide For Anti-icing ([EPG 133.5](#)) and the snow-and-ice section of the Maintenance Policy Manual are both used to clarify the department's official procedure ([EPG 133: Snow and Ice Control](#)).

All abrasives and de-icers are to be applied in accordance with the Operator's Guide for Anti-icing and the snow-and-ice section of the Maintenance Policy Manual. These directives include the following:

Stormwater Management Plan

- Chemicals and stockpiles of treated abrasives are to be stored in a manner to prevent loss of material and minimize damage to state or private property.
- All bulk salt shall be stored inside covered storage structures.
- Asphalt pads are installed under and in front of storage facilities.
- Mixed materials shall be covered when not in use and between storm events.
- No treatment of paved shoulders anti-icing or de-icing chemicals.

Required maintenance practices which have a side benefit to water quality include:

- Application of only the amount of salt or salt/abrasive mix material necessary to provide safe driving.
- Use of clean snow and ice control abrasives (sand or 3/8 crushed aggregate) that contain only 0-10 percent passing a No. 10 sieve.
- Use of snow and ice control chips only when needed to provide traction.
- Sweeping or flushing of the bridges as soon as possible after a storm event.

MoDOT uses a database to track information on how much winter abrasives, calcium chloride, or sodium chloride was applied in the different maintenance areas during a snowfall event. This information is contained in the Winter Events Database Report.

Roadside Management

MoDOT's roadside management program keeps the roadsides safe and attractive. The program establishes and maintains appropriate vegetation to control erosion and limits undesirable vegetation. Specific guidance updated in 2012 is provided in the Roadside Vegetation Management Manual ([EPG 822](#)). This is accomplished through several methods including an effective herbicide program, fertilization, mowing, brush control and litter removal.

Herbicide Program

MoDOT uses a variety of techniques to manage roadside vegetation. Herbicides provide effective and efficient vegetation control. Specific guidance for herbicide use is provided in MoDOT's [EPG 821 Herbicides and Roadsides](#). Operators and their supervisors are required to read and follow the label for application rates. Only non-restricted herbicides are used. Employees are encouraged to obtain and maintain a public operator's license certified by the Missouri Department of Agriculture. Detailed recordkeeping is required. Spray equipment is clean, in good operating order and properly maintained. Operators are instructed to not apply herbicides to standing, running or open water. Only approved aquatic herbicides are used to control undesirable vegetation in or near water. Care is taken to avoid drift, run-off, leaching and spills.

Mowing Operations

Mechanical and chemical vegetation management is done to maintain sight distance, improve aesthetics and control undesirable vegetation. At a minimum, mowing occurs to a distance of at least one mower width from the edge of the traveled way per the guidance contained in the Roadside Vegetation Manual ([EPG 822](#)).

Roadside Facilities

Drainage facilities within the rights of way owned by MoDOT include cattle passes, collection ditches, shoulder drains, side ditches, under drains, outlet ditches, contour ditches and culverts (includes structures that span 20 feet or less). These facilities are maintained to be able to handle runoff from rainfall events. Maintenance includes removing trash, debris and sediment that has collected in the facility. All drainage facilities statewide are inspected periodically; minor defects are repaired as necessary; and major defects are reported to the Maintenance Superintendent responsible for that geographic area. Natural watercourses and streams that pass within the right of way are kept clean so water can flow freely. Maintenance policies and operations can be found in the EPG Category [171](#). This includes water management, roadsides, vegetation management, snow and ice control, and many others.

Procedures to Prevent, Contain and Respond to Spills

Procedures to prevent, contain and respond to spills are found in [MoDOT's Hazardous Material Response Plan](#) to assure the material is handled properly. All vehicles carrying hazardous materials must be identified by the distinct diamond shaped symbol. The following are guidelines taken from MoDOT's Guide to Hazardous Material Spill Response on State Highways:

- Avoid contact with and breathing vapors of the spilled material.
- No smoking allowed in the spill area.
- If a state waterway is involved in the spill the Missouri Department of Natural Resources must be contacted along with the MoDOT District Hazardous Materials Spill Coordinator.
- Obtain facts and information on the spill for the emergency team and maintenance supervisor.
- Call the Missouri State Highway Patrol for help and notify the maintenance supervisor.
- Coordinate with emergency response personnel.
- An "Incident Commander" should coordinate with other agencies and handle direct reporting of the spill.
- Use appropriate traffic control to isolate the spill area from public contact.
- Wait for instructions and do not clean up the spill or contaminated area.

Stormwater Management Plan

- If private property or waterways are threatened, containment of spill should be coordinated with Missouri Department of Natural Resources, Missouri State Highway Patrol and the appropriate maintenance supervisor.

Spill Prevention and Response Procedures at Maintenance Facilities

MoDOT has implemented Spill Prevention Control and Countermeasure (SPCC) plans at maintenance facilities to prevent oil spills from occurring, and to perform safe, efficient and timely response in the event of a spill or leak. In accordance with United States Environmental Protection Agency (EPA) regulations ([40 CFR 112](#)), MoDOT must prepare and implement an SPCC plan for facilities that could reasonably be expected to discharge petroleum or hazardous material into or upon navigable waters or adjoining shorelines; that meet one of the following conditions:

Above-ground oil storage capacity exceeds 1,320 gallons; or

Underground oil storage capacity exceeds 42,000 gallons, unless the underground tanks are subject to all of the technical requirements of 40 CFR 280 or a state program approved under [40 CFR 281](#).

(Missouri's approved program is 319.100 – 319.139, RSMo and 10 CSR26-1 thru 10 CSR26-5 Rules for Underground Storage Facilities.)

As defined by 40 CFR Part 112, oil includes all grades of motor oil, hydraulic oil, lube oil, fuel oil, gasoline and diesel, automatic transmission fluid (ATF), used oil and transformer mineral oil. The definition also includes non-petroleum oils such as animal or vegetable oils and synthetic oils.

Facility Runoff Control Plan

MoDOT-owned operations and maintenance facilities with the TS4 coverage area are required to have a Facility Runoff Control Plan (FRCP) (Table 1). The plan requires, at a minimum, bi-yearly (every 6 months) inspections of the property for implementing the GoodHousekeeping/Pollution Prevention measure to identify potential target pollutants and sources and take action for managing those.



Figure 11: Maintenance facility in SW District.

Stormwater Management Plan

Target pollutants are generated through the day-to-day operation and maintenance activities conducted within maintenance facilities. There are five groups of target pollution categories include a range of pollution sources that can be managed to reduce the risk of stormwater pollution by minimizing the exposure of target pollutants to the environment. Problems identified during the inspection should be addressed or resolved before the next rain event and no later than the next inspection.

The FRCP is kept on MoDOT's sharepoint site and at the facility location along with the SPCC plan.

Action: Continue to educate maintenance staff and MoDOT general staff on SPCC and NEPA. Evaluate the effectiveness of housekeeping activities and identify those processes and/or procedures that are impacting waters of the state using semi-annual inspections of all MoDOT facilities to assess compliance.

Measurable Goal: SPCC, IDDE, MCM6, and various other trainings at least every other year.

Action: Continue dialogue with the Environmental Steering Committee (ESC) to evaluate the effectiveness of housekeeping processes and procedures. Formed in 2007, the ESC continues to meet quarterly. The ESC discusses storm water issues as they come up for the department. The ESC has additionally provided guidance on issues concerning compliance with the consent decree with EPA and DOJ action regarding NOVs, and wastewater facility permits and compliance. Ongoing inspections of maintenance facilities found that not only storm water control has improved but all aspects of environmental compliance over the last several inspection cycles. Under direction of the ESC, MoDOT will continue to evaluate existing maintenance operation policies that have potential to impact water quality. Many of the implemented and proposed changes in MoDOT's winter operations have had, or may have, a positive impact on water quality:

Measurable Goal: Document how many times and what topics regarding the TS4 are discussed at the quarterly ESC meetings.

Action: MoDOT uses chemicals and abrasives during winter operations to facilitate the safe travel of motorists using state roads. Depending on the type of event, MoDOT uses its Winter Operations Manual to dictate methods of snow and ice removal.

Measurable Goal: Report materials used for winter operations.

Action: Develop and test new housekeeping processes and procedures to add to current available resources and techniques including ways minimize or prevent the spread of exotic/invasives, or pollutants.

Stormwater Management Plan

Measurable Goal: Report any new processes' or procedures that are adopted.

Action: Bridge cleaning and flushing are used to remove de-icing chemicals from the bridge deck, drains, expansion device drains, piers, abutments, and lower truss chords; thereby prolonging the life of the structure. Bridge cleaning activities use dry methods and equipment (scraping, sweeping, and vacuuming), to prevent debris, sediment, and other substances from entering waters of the State. Bridge flushing and cleaning shall adhere to the process and procedures outlined in the [EPG 771.2](#) and the beneficial use requirements outlined in [EPG 127.25.1.4](#).

Measurable Goal: MoDOT will ensure the appropriate BMPs are being implemented prior to and during such activities and report approximately how many bridges are flushed/cleaned in a reporting cycle.

Stormwater Management Plan

FID	NAME	DISTRICT	COUNTY_NAM	TYPE	TEXT_DIREC	Adjacent MS4 Operator	Name of Receiving Water Body
1	ST. JOSEPH COMMUTER LOT	1	BUCHANAN	Commuter Lot	IS 29 AND US 169 (S)	St. Joseph	Trib. Candy Creek
2	ST JOSEPH	1	BUCHANAN	Shed	1/4 mile East of I-29 at the South US 169 exit	St. Joseph	Trib. Candy Creek
3	ST. JOSEPH DISTRICT OFFICE	1	BUCHANAN	Complex	3602 N. Belt hwy	St. Joseph	Trib. Missouri River
4	HANNIBAL COMPLEX	2	MARION	Complex	US 61 S, 1 Mile south of Rt MM 1.2 miles	Hannibal	Trib. Bear Creek
5	LEES SUMMIT DISTRICT COMPLEX	3	JACKSON	Complex	Exit 10A from IS-470 S turn right, turn right on first road right 1 mile up Independence Ave, Shed on right	Lee's Summit	Trib. Unity Lake #2 Kansas City sewer system to treatment facility
6	18TH AND INDIANA	3	JACKSON	Shed	18TH AND INDIANA (Motorist Assist) West Outer road South of US 71 and south of MO 58 interchange	Kansas City UA	East Creek
7	BELTON	3	CASS	Shed	West Outer Rd of MO 291 1/2 mile N of US 24	Kansas City UA	Trib. Mill Creek
8	INDEPENDENCE	3	JACKSON	Shed	West of 291 and south of Strother Rd	Lee's Summit	Trib. Lakewood Lakes
9	LEES SUMMIT STROTHER RD	3	JACKSON	Shed	West of 291 and south of Strother Rd	Marshall	Trib. North Fork Finney Creek
10	MARSHALL	3	SALINE	Shed	.25 miles West of Hwy 65 on Hwy 20	Marshall	Kansas City sewer system to treatment facility
11	MULBERRY	3	JACKSON	Shed	650 Mulberry St, Kansas City take Riverside exit to 69 go left to Rt AA then left, building on westside of road	Kansas City UA	Line Creek
12	NORTHMOOR	3	PLATTE	Shed	2200 South Limit, off 65 South by Mo State Fairgrounds	Kansas City UA	Trib. Flat Creek
13	SEDALIA	3	CLAY	Shed		Kansas City UA	Trib. Missouri River
14	SKILES	3	CLAY	Shed		Kansas City UA	Little Blue River
15	STADIUM	3	JACKSON	Shed	SE outer rd of I-70 and Blue Ridge Cutoff Behind Holiday Inn	Kansas City UA	Wears Creek
16	JEFFERSON CITY DISTRICT COMPLEX	4	COLE	Complex	DISTRICT 5 COMPLEX Paris Rd - Rt B North of US 63 1/4 miles north, on the northside of the road	Jefferson City	Trib. Hinkson Creek
17	COLUMBIA	4	BOONE	Shed	.2 off US 54, Rt F exit Over overhead to 1st st on left, 1st on drive rt	Columbia	Trib. Stinson Creek
18	FULTON	4	CALLAWAY	Shed	Off Big Horn and 50 West next to CDL site	Fulton	Trib. Binder Lake
19	JEFFERSON CITY	4	COLE	Shed	Off 127 exit. From LP44(Elm St) across from Case knife Outlet	Jefferson City	Trib. Goodwin Hollow
20	LEBANON	4	LACLEDE	Shed	Northeast corner of I-64/40 & Ballas road (Call Ahead)	Lebanon	Trib. Deer Creek
21	BALLAS	5	ST. LOUIS	Shed	1/2 mile S of 270 off 367. Turn off S367 to R go up hill by CDL site	Town & Country-MSD	Trib. Maline Creek
22	BELLEFONTAINE	5	ST. LOUIS	Shed	from 55 take Park Ave or 7th street exit turn east on Park take it to Broadway go north 2 blocks	St. Louis UA	
23	BROADWAY	5	ST. LOUIS CITY	Shed	Off of MO 30 on Local Hillsboro Road	St. Louis UA	Trib. Big River
24	CEDAR HILL	5	JEFFERSON	Shed	On North Outer Rd, take 109 from I-44, turn left 1 mile down on right	Eureka	Flat Creek
25	EUREKA	5	ST. LOUIS	Shed	1000 Airport Rd. Take U.S. 61 approximately 0.5 miles south of U.S 67 to Airport Rd.	St. Louis UA	Plattin Creek
26	FESTUS	5	JEFFERSON	Shed		St. Louis UA	River Des Peres
27	HAMPTON	5	ST. LOUIS CITY	Shed	Near I-55 & Bayless. From I-55 go W on Bayless to Union, left on Union cross I-55 go left on Hoffmeister until you reach shed	St. Louis UA	Gravois Creek
28	LEMAY	5	ST. LOUIS	Shed	Southwest corner of I-70 at Bermuda Road	St. Louis UA	Marlene Creek
29	NORMANDY	5	ST. LOUIS	Shed		St. Louis UA	
30	BARRETT STATION	5	ST. LOUIS	Shed	BARRETT STATION	St. Louis UA	
31	SPECIAL-MOTORIST ASSIST-	5	ST LOUIS	Shed	CHESTERFIELD	Town & Country-MSD	Trib. Creve Coeur Creek
32	ST CHARLES	5	ST. CHARLES	Shed	Old 94 and Muegge Rd. Hwy 94 to Praile, left on old 94	St. Louis UA	Dry Creek
33	SUNSET HILLS	5	ST. LOUIS	Shed	on Rt 30 between 270 and 141 on Rahning Rd, 1/4 on left	Sunset Hills-MSD	Trib. Meramec River
34	WENTZVILLE	5	ST. CHARLES	Shed	0.75 miles North of Rt. A	St. Louis UA	Trib. Dry Branch Creek
35	BARNHART	5	JEFFERSON	Shed	Barnhart off Mo 744, .4 mile west of 65, then .2 mile north on Fairview west side of road	St. Louis UA	Glaize Creek
36	SPRINGFIELD COMPLEX	6	GREENE	Complex	Rt 32, 1/2 mile East of Rt 13	Springfield	Trib. South Dry Sac River
37	BOLIVAR	6	POLK	Shed	Corner of 171 & 96 one mile West of town	Bolivar	Branch Creek
38	CARTHAGE	6	JASPER	Shed	.8 mile East of Bus 71 off Rt FF	Carthage	Trib. Spring River
39	JOPLIN	6	JASPER	Shed	From Jct 60 & 59 Go N on Bus 60 1 mile on left next to Meeks	Joplin	Trib. Silver Creek
40	NEOSHO	6	NEWTON	Shed	Rt F exit off 65, East to to 2nd stoplight, right 300 yards	Neosho	Trib. Hickory Creek
41	OZARK	6	CHRISTIAN	Shed		Springfield	Trib. Elk Valley
42	STRAFFORD INMATE LOT	6	GREENE	Shed	412 West to Rt O, right on O, 1 mile on right (white fence)	Springfield	Pearson Creek
43	KENNETT	7	DUNKLIN	Shed		Kennett	Ragland Slough
44	POPLAR BLUFF	7	BUTLER	Shed	Outer road of US 60 @ North end of Poplar Bluff	Poplar Bluff	Trib. Black River and Trib. Pike Creek
45	SIKESTON	7	SCOTT	Shed	I-55 S to exit 67, left, East on E Malone 1.5 miles, N side Edwards	Sikeston	Trib. St. Johns Ditch

Table 1: MoDOT facilities within the TS4 coverage area that have operations activities and are required to have a FRCP.

APPENDIX



Missouri Department of Transportation

888-ASK MoDOT (275-6636)



[About Us](#) |
 [Travelers](#) |
 [Business](#) |
 [Bidding](#) |
 [Plans & Projects](#) |
 [Other Transportation](#) |
 [News & Information](#) |
 [Programs & Services](#) |
 [Safety](#) |
 [Careers](#)

HOME >> [REQUEST A SPEAKER](#) >> [REQUEST A SPEAKER](#)

Request a Speaker

Keeping you on the move and providing you with a world-class transportation experience is the Missouri Department of Transportation's mission. There's a lot that goes into our work, and we're always looking for ways to tell our story.

That's why we'd like to talk to your group. Whether it's addressing local issues such as why we installed a traffic signal at a particular intersection to what the future holds for Missouri transportation, we can provide an expert on the subject. We want you to be informed so you can help us make effective and efficient decisions on the daily transportation issues we face.

To schedule a speaker, fill out our [request form](#) or contact your local MoDOT Customer Service Center toll-free at 1-888 ASK MoDOT (888-275-6636).

You can also choose a speaker by region and topic.

Topic

[Northwest District](#)
[Northeast District](#)
[Kansas City District](#)
[Central District](#)
[St. Louis District](#)
[Southwest District](#)
[Southeast District](#)



About Us

[Who We Are](#)
[Annual Reports](#)
[Our Mission, Values and Tangible Results](#)
[Missouri Highways and Transportation Commission](#)
[Career Opportunities](#)

How Do I...

[Adopt a section of highway](#)
[View construction projects](#)
[Request a highway map](#)
[Report a road concern](#)

Contact Us

Missouri Department of Transportation
 Central Office
 105 W. Capitol Avenue
 Jefferson City, MO 65102
 1-888-ASK-MODOT (275-6636)
 1-866-831-6277 (Motor Carrier Services)
 Driver's License Offices

Bookmark This Page!

[Missouri License Plates - Renew Online](#) |
 [Missouri State Government](#) |
 [Missouri Amber Alert](#) |
 [Missouri Homeland Security](#)



© 2013 Missouri Department of Transportation. All Rights Reserved. Privacy Policy.

[Give Us Your Feedback On This Page!](#)



**Missouri
Department of Transportation**
888-ASK MoDOT (275-6636)




[About Us](#) | [Travelers](#) | [Business](#) | [Bidding](#) | [Plans & Projects](#) | [Other Transportation](#) | [News & Information](#) | [Programs & Services](#) | [Safety](#) | [Careers](#)



Citizen's Guide to Transportation Funding in Missouri

How does transportation funding work?
What is your investment in Missouri's roads?
What are our goals for Missouri's high-priority transportation needs?



Traveler Information Map

Check MoDOT's Traveler Info Map for weather-related road conditions, flood closures & work zone locations.



Tips for using the map

Text Report - Road conditions

Text Report - Road Closures and delays

Road Condition Definitions

Links to surrounding states

 Text Alerts - [Sign Up Now!](#)

Email Notifications - [Sign Up Now!](#)

Get Your Mobile Apps





 [Rate Our Work Zone](#)

Quick Links


- [View from the Commission](#)
- [Zipper Merge](#)
- [Road To Tomorrow](#)
- [I-70 Tolling Report](#)
- [STIP](#)
- [Report A Road Concern](#)
- [MoDOT Bid Letting Plans Room](#)
- [Fallen Workers In Memoriam](#)
- [Freight On The Move](#)
- [MoDOT Proposed Rules](#)
- [Bidding Opportunities](#)
- [Motor Carrier Services](#)
1-866-831-6277
- [Missouri "On The Move"](#)
- [File A Claim](#)
- [Area Engineers](#)
- [Tracker](#)

MoDOT Statewide News

MoDOT Following Governor's Parental Leave Policy
Thu, 16 Mar 2017

Don't Push Your Luck. Driving Impaired Changes Everything.
Tue, 14 Mar 2017

MoDOT Waives Oversize Travel Time Restrictions for Wildfire Disaster Relief
Tue, 14 Mar 2017

[Get More News](#) • [Newsroom](#) • [ExpressLane](#) 

Highway Fatalities

Missouri State Highway Fatalities as of 3/15: 2017 - 144 | 2016 - 162

More Links


<ul style="list-style-type: none"> Arrive Alive - SaveMOlives Partnership Development Adopt - A - Highway Engineering Policy Guide Environmental & Historic Preservation Embracing Diversity and Inclusion 	<ul style="list-style-type: none"> Disadvantaged Business Enterprises Doing Business With MoDOT Local Programs Consultant Services Realty for Sale Obtain a Drivers License
--	---

Major Projects

- [Champ Clark Bridge](#)
- [Route 141 @ I-44 Improvement](#)
- [US 69 Bridges - Kansas City](#)
- [Route 47 Missouri River Bridge](#)
- [Poplar Street Bridge](#)
- [St. Louis Safety Project](#)
- [Intersections and Interchanges](#)

[More...](#)

Your Local MoDOT





**Missouri
Department of Transportation**
888-ASK MoDOT (275-6636)



[About Us](#) | [Travelers](#) | [Business](#) | [Bidding](#) | [Plans & Projects](#) | [Other Transportation](#) | [News & Information](#) | [Programs & Services](#) | [Safety](#) | [Careers](#)

[HOME](#) >> [STORMWATER](#) >> [STORMWATER HOME](#)

Stormwater

Stormwater is rainfall and snowmelt moving across and through the ground eventually emptying into lakes, rivers, and underground aquifers, all of which provide the drinking water we consume daily.

Stormwater picks up excess pollutants along the way that is a leading cause of Missouri's water quality problems. Each of us contributes to this problem without even realizing it. Fortunately, there are ways in which we can all help to lower the amount of pollutants reaching our waterways and groundwater.

What You Can Do To Prevent Stormwater Pollution

- Don't Litter
- Prevent Erosion
- Use Fertilizers and Herbicides Sparingly
- Dispose of Vehicle Fluids and Household Hazardous Waste Properly
- Have Your Septic Tank Serviced Regularly
- Do Not Dump Pollutants Down Storm Drains
- Pick Up After Your Pets
- Direct Gutter Downspouts Away From Driveways
- Participate In Community Clean-Ups
- Help Educate People In Your Community

What MoDOT Is Doing To Reduce Stormwater Pollution

Whenever one acre or more of land is disturbed for roadwork, it is MoDOT's responsibility to implement control measures to prevent the excessive release of sediment and pollutants into nearby waterways. This is done through the use of an Erosion Control Plan, which requires a variety of temporary and permanent measures to prevent soil and other pollutants from leaving the construction site. Some of these measures include perimeter silt fencing, ditch checks, and temporary and permanent seeding.

MoDOT provides specialized training for erosion and sediment control for contractors and its own personnel and requires that all environmental permits be in place before construction begins. Contractors are required to abide by all environmental regulations and laws when performing road construction activities. These include air pollution, spill response, solid waste management, and water pollution control. The department also has an [Adopt-A-Highway](#) program that allows community and area groups to pick up litter from our highways.



[TS4 Permit](#) and [SWMP](#)

[Stormwater Concern](#)

[Stormwater Brochure](#)

For Stormwater concerns, please visit our [Report A Stormwater Concern](#) page.

[Fact Sheet Snow Removal](#)

For More Information on Stormwater

MoDOT
stormwater@modot.mo.gov

Missouri Department of Natural Resources
www.dnr.mo.gov/env/wpp/stormwater

U.S. Environmental Protection Agency
http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Stormwater Prevention Partners
<http://www.helpthehinkson.org>

About Us

[Who We Are](#)
[Annual Reports](#)
[Our Mission, Values and Tangible Results](#)

How Do I...

[Adopt a section of highway](#)
[View construction projects](#)
[Request a highway map](#)

Contact Us

Missouri Department of Transportation
Central Office
105 W. Capitol Avenue
Jefferson City, MO 65102
1-888-ASK-MODOT (275-6636)

Category:129 Public Involvement

From Engineering Policy Guide

Missouri citizens expect and demand an active voice in the location and design of transportation facilities. They recognize the important role transportation has in their life as well as the life of their community. Existing transportation facilities and in particular transportation improvements, have a direct impact on the social, economic and environmental resources of the community. As a result, MoDOT values the input the public provides on transportation improvements and has established various methods to gather it. Some of these methods are:

- Identification of needs
- Prioritization of needs
- Funding distributions
- Prelocation Study Meetings
- Agency scoping Meetings
- Location Public Hearings
- Formal Public Hearings
- Open House Public Hearings
- Design Public Hearings
- Project selection

In addition, MoDOT provides useful; information to Missourians concerning the operation of the highway system. This information is available from the following sources:

- Work Zone Status (<http://www.modot.mo.gov/workzones/WorkZoneMapIntro.htm>)
- Road Condition Report (http://www.modot.mo.gov/road_conditions/WinterRoadConditions.htm)

The development of quality transportation improvements depends on early, often and continuous involvement of the public in project decisions. Additionally, real time information about the State's highway system permits the traveling public to use it efficiently. MoDOT always looks for ways to improve the quantity and quality of transportation information to the citizens of Missouri.

The public frequently questions not only the design and physical features of a project, but also its basic premise (the purpose and need) and assumptions (e.g., the range of alternatives) as identified by MoDOT.

It is important to remember that gaining public involvement through any means, including the formal public hearing, is not just a base to be touched or a box to be checked in the project development process. Public involvement allows MoDOT to gather real, valid input on transportation needs and to work with customers to refine solutions that meet those needs.

Figures

Location Study Display

Commission Exhibit

Forms

Letter Advertising a Public Hearing

Notice of Public Hearing

Advertise the Opportunity for a Public Hearing

Request for Approval of Location and/or Design of Highways

Commission Backup Form Blank

([http://epg.modot.mo.gov/forms/DE-](http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Blank.dot)

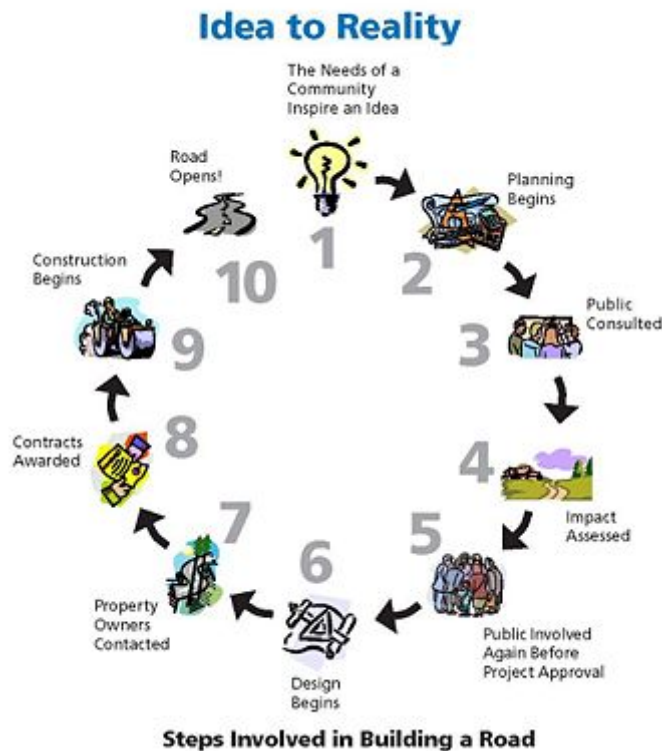
[DEForms/Commission%20Backup%20Form%20Blank.dot](http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Blank.dot))

Instruction for the Commission Backup Form

([http://epg.modot.mo.gov/forms/DE-](http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Instructions.dot)

[DEForms/Commission%20Backup%20Form%20Instructions.dot](http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Instructions.dot))





This involvement is also important as we attempt to develop transportation projects within the context of the communities we serve. Early and continuous solicitation of public opinion will identify what customers expect from our improvements.



A successful project development team includes engineers, technicians, environmental, cultural resource, right of way personnel and public affairs professionals. With these combined resources, a truly effective public involvement plan can be developed for each project, maximizing our opportunity to arrive at the best transportation solution.

The following guidelines for public meetings and hearings are not to be viewed as complete. They

outline the minimum level of effort for public meetings; however, more effort is expected on most projects.

Particular care will be paid to contacting property owners adjacent to the improvement, public officials, elected representatives, law enforcement, schools and emergency services regarding the proposed improvement. Innovative methods to involve minority and economically disadvantaged sectors of the community, as well as other groups (senior citizens, economic development interests, and historical and environmental groups) are to be used.

Often the people who attend public information meetings are not a true representation of the public at large, rather they are primarily those who fear they will be adversely impacted by the proposed improvement. Therefore, the challenge exists to find ways to reach the broadest spectrum of the community.

MoDOT efforts are expected to exceed the minimum necessary to satisfy state and federal regulations. Our efforts must provide a truly inclusive atmosphere for public input into the determination of the purpose and need, the development of a range of alternatives, and the choice of selected alternatives and plans for transportation improvements.

Public hearings and public meetings are forums for receiving citizen comments. Both are used to comply with the Missouri Highways and Transportation Commission's (<http://www.modot.mo.gov/about/commission/index.htm>) desire to furnish the public with general information and to allow the public to express their opinions regarding highway matters. Information related to the impacts of a proposed action can also be gathered. SAFETEA-LU specifically requires public involvement in the definition of the purpose and need for a project and in the determination of the range of alternatives to be considered. The National Environmental Policy Act (NEPA) and FHWA regulation 23 CFR 771 require one or more public hearings or opportunity for hearing(s). The Commission directs MoDOT to conduct location and design public hearings to gather public comment. Public hearings have a prescribed format, while public meetings are generally optional events and are tailored to meet department or community needs. Specific public meetings that may be necessary are prelocation study meetings. Agency scoping meetings, the only type of required meeting where the general public is not specifically invited, are normally required for projects with potential significant impacts on the environment.

Prelocation study meetings and public hearings must be advertised and structured to ensure opportunities for minority, low income and disadvantaged populations to participate. Additional effort may be required by the district to identify and contact these populations. These efforts, beyond advertisements in newspapers and media announcements, will be documented for inclusion in environmental documents and for departmentwide Title VI and environmental justice compliance. Minority and disadvantaged populations are those defined by Title VI and Environmental Justice guidance. Low income populations are those defined by the census category. If there are questions concerning minority and disadvantaged population participation, contact the socioeconomic specialist in the Design Division (<http://wwwi/design/default.htm>) .

Contents

- 1 129.1 Prelocation Study Meetings
- 2 129.2 Agency Scoping Meetings
- 3 129.3 Location Public Hearings
- 4 129.4 Coordination with other Agencies
- 5 129.5 Section 4(f) and 6(f) Lands
- 6 129.6 Railroads
- 7 129.7 Design Public Hearings
- 8 129.8 Noise Wall Public Meeting and Voting
- 9 129.9 Advertisement for Public Hearings
- 10 129.10 Advertisement for the Opportunity for a Public Hearing
- 11 129.11 Procedures for Conducting Public Hearings
 - 11.1 129.11.1 Formal Public Hearings
 - 11.1.1 129.11.1.1 Formal Location Public Hearings
 - 11.1.2 129.11.1.2 Formal Design Public Hearings
 - 11.2 129.11.2 Open House Public Hearings
 - 11.3 129.11.3 Transcripts
- 12 129.12 Presentation for Location or Design Approval to the Commission
- 13 129.13 Public Involvement for Stormwater

129.1 Prelocation Study Meetings

A prelocation study meeting is held for all projects with an Environmental Assessment (EA) or Environmental Impact Statement (EIS) environmental classification prior to the preparation of a location study/environmental report. For projects with an environmental classification of Categorical Exclusion (CE) or Open-ended Categorical Exclusion (CE2) that may have effects on the environment, or contemplate alternate locations around or through communities, a prelocation study meeting will be held prior to the preparation of a conceptual study or CE2 documentation. The MoDOT project manager is responsible for scheduling and coordination of the prelocation study meeting in cooperation with the Design Division, for all projects including those in which consultants are used to perform the study. This does not mean that the MoDOT project manager cannot assign duties for the meeting to the consultant's staff if applicable. However, the MoDOT project manager is responsible for the content and quality of the meeting.

The purpose of a prelocation study meeting is to describe the general nature of the proposed project to the public and to obtain comments concerning the project's purpose and need, the range of alternatives and their impact on local communities and the environment of the area. Primary information sought will concern community values, goals and objectives, and other areas of special interest of which the local citizens may be aware including history, archaeology, geology, biology and public lands in the study area. The draft Purpose and Need document, as

accepted by the Design Division, will be available at the meeting for consideration and comment by the public. Comments and information received at the meeting will be used to refine or expand the draft Purpose and Need prior to its inclusion as a section of the Location Study Report.

At least two months prior to the prelocation study meeting date, two copies of a written Request for Environmental Services (RES) will be sent to the Design Division (<http://wwwi/design/default.htm>) requesting preliminary scoping, screening and early constraint identification (including but not limited to wetlands, cultural resources and public use areas). The Design Division, after receiving the request, will perform the necessary internal scoping (as opposed to agency scoping), screening and constraint identification activities. The information that is gathered during screening will be given to the MoDOT project manager to be used in display preparation. Preliminary scoping may also consist of agency scoping meetings for complex projects or written agency correspondence for less complex projects as determined by the Design Division and FHWA. The information from the screening and constraint identification is presented to the public at this meeting, as it can limit potential alternatives and is therefore made available at the prelocation study meeting. An exception, however, is the location of archaeological sites, endangered species, and caves will not be disclosed in an effort to prevent habitat destruction, vandalism and looting of these sites.

Displays available at the prelocation study meeting are general in nature showing the entire study area with no definite solutions identified. Typically these include one display showing all environmental and cultural constraints identified as a result of the written request for environmental services, except for archaeological sites. Other displays might include information from the Purpose and Need document concerning accidents, capacity and/or deficiencies of the existing facility. A display showing the general process for completion of a location study/environmental report with the prelocation study meeting stage highlighted is helpful to the public in understanding the magnitude of the process that MoDOT must complete. For projects where relocation of a route might be an option, a blank display on which the public can draw suggested alignments is helpful. A display that shows the range of alternatives considered is also helpful to the public. This display must be included in the environmental document. Alternatives that will not be carried forward for further consideration are to be identified with reasons for the decision. Preparation of all displays is the responsibility of the district and will be retained for possible use at future meetings.

Adequate and appropriate staff will be available to answer questions from the public during the meeting. This staff normally includes the district engineer, project manager, public affairs specialist and the project designer. Other staff would be included as needed on a project-by-project basis. The Design Division is consulted when it is necessary for particular specialists from the division to attend the meeting. If consultant staff is involved in the preparation of the study, appropriate members of the consultant staff will also attend. The project manager is responsible for coordinating attendance of appropriate staff from the district, consultant and the Central Office prior to holding the meeting.

Appropriate news releases are prepared and distributed for publication by the district in advance of the prelocation study meeting so the general public will have an opportunity to attend and to participate. A copy of the news release is sent to the State Design Engineer and FHWA. In addition to the news releases, specific notification of the meeting is made to interested property owners, community leaders, planning commission representatives, local representatives of state agencies (i.e., the Missouri Department of Conservation (<http://www.mdc.mo.gov/>) and the Missouri Department of Natural Resources (<http://www.dnr.mo.gov/index.html>)) and any other special interest groups. Federal resource agencies such as the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Park Service, the appropriate U.S. Army Corps of Engineers district office, and others are also notified of the meeting. The U.S. Coast Guard is notified if the proposed action involves a navigable waterway. Minority and ADA (Americans with Disabilities Act) groups are invited to this meeting, if they exist in the project area.

Following the prelocation study meeting, the district provides the Design Division with a summary of the meeting along with any handouts that were used. Written comments received as a result of the meeting are also provided.

This summary includes a synopsis of public comments expressed at the meeting. If appropriate, the transmittal letter includes any recommended solutions or revisions that would address the concerns brought up at the meeting. Comments and recommendations from the meeting will be utilized by the district in refining the purpose and need for the project, developing the range of reasonable alternatives and developing the location study/environmental report. Additional scoping meetings with the public or other agencies may also be held at this stage of project development. Any meetings held by the district or the Design Division are documented for use in the preparation of the location study/environmental report.

129.2 Agency Scoping Meetings

Meetings with concerned governmental agencies are held on all projects with an environmental classification of EIS and for complex EAs unless prior consent is obtained from FHWA. Agency scoping meetings are held prior to the preparation of the location study/environmental report, but following the preparation of the draft Purpose and Need document and the preliminary screening. Agency scoping meetings may be held prior to or following prelocation study meetings. Agency scoping meetings are generally held in Jefferson City as needed on specific projects. They may also be incorporated into the Periodic Agency Meetings held by the Design Division at the discretion of the environmental process and policy specialist and FHWA.

These meetings will describe the general nature of the proposed project and will obtain comments from the agencies concerning the project's purpose and need, the range of alternatives and their impact on the environment. An Agency Scoping Meeting defines the issues and alternatives that will be examined in detail in the EIS or EA while simultaneously devoting less attention and time to those issues that cause no concern. The MoDOT project manager initiates this meeting working through the environmental representative in the Design Division. It is generally held in Jefferson City in coordination with FHWA. The MoDOT project manager is responsible for arranging the meeting. This includes the coordination of attendance by appropriate staff (district, Central Office, consultant, etc.) and coordination of topics and displays to be presented at the meeting. This does not mean that the MoDOT project manager cannot assign duties for the meeting to consultant staff if applicable. However, the MoDOT project manager is responsible for the content and the quality of the meeting.

Prior to the meeting, the district will send invitations to all appropriate agencies with the meeting time and location. The district will supply the Design Division and FHWA with copies of the draft Purpose and Need document along with any other pertinent information concerning the proposed project that was mailed with the invitation. A map showing the study area is also necessary.

At this meeting displays are available covering the study area showing all known constraints, both environmental and engineering. The range of alternatives that have been or are being considered are shown. These can be the same displays used at the prelocation study meeting. The MoDOT project manager will facilitate the meeting and briefly present the project Purpose and Need. Other topics presented and discussed will be unique to the specific project. It may be appropriate to have a general overview of known environmental and cultural constraints and it may be necessary to have a specific specialist in attendance with a presentation of one constraint. The MoDOT project manager will coordinate the agenda ahead of time with the environmental representative from the Design Division to ensure a productive and informative meeting occurs in the time allotted. Coordination between the MoDOT project manager, district staff, the consultant staff if applicable, and the Design Division must occur prior to the meeting. All four groups have a role in the meeting.

The environmental section in the Design Division will coordinate periodic meetings with all governmental agencies. These meetings will share information concerning upcoming EA and EIS projects. They will also discuss the status of ongoing projects with the various agencies that are involved. Part of the agenda may be set aside for any agency scoping meetings that are needed. Agency issues beyond specific project issues will also be discussed.

District staff will be notified of the date and agenda in advance of the periodic meetings. District participation in the meetings will be coordinated with the MoDOT project managers involved for any specific projects on the agenda, but not necessarily with policy or procedure topics. Minutes of all meetings will be mailed to the district engineers.

129.3 Location Public Hearings

One or more public hearings or opportunity for hearing(s) are required by the National Environmental Policy Act (NEPA) and FHWA regulation 23 CFR Part 771. The Commission requires a location public hearing for all projects with an environmental classification of EA and EIS. Projects with an environmental classification of CE may require a location public hearing if conditions are similar to those described for design public hearings. It may be acceptable to hold a combined location and design public hearing for CE projects. It should be noted that CE2 projects can be reclassified by FHWA as either EA or CE. This reclassification will occur before the time of any expected location public hearing. If a CE2 is reclassified as an EA, a location public hearing will be required after the EA is approved by FHWA. If a CE2 becomes a CE, a location public hearing may be required.

After FHWA approves the EA or Draft EIS, the Design Division will notify the district that a location public hearing is to be held. While tentative arrangements can be made for the location public hearing prior to the document being signed, it is not advisable to firm up the arrangements or advertise for the hearing until AFTER the signature is received. In the case of an EIS project, once the draft EIS is signed a notice of availability (NOA) must be published prior to advertising for the location public hearing. This is done by the EPA once they receive the approved draft EIS in Washington D.C. For a project with an environmental classification of CE, a location public hearing may be held after the conceptual plan is approved.

A location public hearing is held to provide the opportunity for effective participation by interested persons in discussing specific location features, including the social, economic, environmental, and other effects of all the reasonable project alternatives. These hearings afford the department an opportunity to receive information from sources that will be of value in choosing a preferred location. The hearings are not to determine location by a majority vote of those persons present.

129.4 Coordination with other Agencies

Coordination with other agencies and groups is an integral part of the environmental process. Pertinent information obtained from prelocation meetings, agency scoping meetings or other coordination is made available to the public as a part of the location public hearing. A basic list of agencies is available in the box to the right.



Basic List of Agencies to be Notified of Date of Hearings

MISSOURI CONSERVATION DEPARTMENT Planning Division P.O. Box 180 Jefferson City, Missouri 65102	MISSOURI DEPT. OF ECONOMIC DEVELOPMENT Division of Tourism P.O. Box 1055 Jefferson City, Missouri 65102
---	---

These interested agencies are to be advised by the district of the date of the hearing at the time the notice for the location public hearing is published. The letter further advises the agency that their written views, if any, will be available for public viewing at the location public hearing if submitted to the district not later than three calendar days prior to the date of the public hearing and that written views will be made a part of the transcript if received within ten working days after the date of the location public hearing.

129.5 Section 4(f) and 6(f) Lands

Section 106 of the National Historic Preservation Act requires that the public be offered the opportunity to receive information about and comment on the project's effect on historic properties. The project's impacts on historic properties should be identified and discussed at public hearings. Documentation of public input or

U. S. FISH AND WILDLIFE SERVICE U.S. Dept. of Interior Columbia Field Office 101 Park De Ville Dr., Suite A Columbia, Missouri 65203-0057	MIDWEST REGION Regional Director National Park Service 601 Riverfront Drive Omaha, NE 68102-4226 (402) 661-1736
CHIEF, ENVIRONMENTAL IMPACT ASSESSMENT PROGRAM U.S. Geological Survey; MS-423 U.S. Department of the Interior 12201 Sunrise Valley Drive Reston, Virginia 22092	BUREAU OF INDIAN AFFAIRS U.S. Department of the Interior (For Jackson and Lawrence Counties Only) Area Director Anadarko Area Office P.O. Box 368 Anadarko, Oklahoma 73005
U.S. ENVIRONMENTAL PROTECTION AGENCY REGION VII ENVIRONMENTAL REVIEW COORDINATION, WETLANDS, WATERSHEDS, PESTICIDES DIVISIONS 901 North 5th Street Kansas City, Kansas 66101	DIRECTOR, DEPARTMENT OF NATURAL RESOURCES 205 Jefferson Street P.O. Box 176 Jefferson City, Missouri 65102-0176
Director of State and Local Government Affairs Missouri Farm Bureau P.O. Box 658 Jefferson City, Missouri 65102	STATE OF MISSOURI EMERGENCY MANAGEMENT AGENCY ATTN: Floodplain Management Officer P.O. Box 116 Jefferson City, Missouri 65102
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Third Floor Robert A. Young Federal Building 1222 Spruce Street St. Louis, MO 63103-2836	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT Room 200 Gateway Tower II 400 State Avenue Kansas City, KS 66101-2406

knowledge regarding these impacts is required.

129.6 Railroads

FEDERAL HIGHWAY ADMINISTRATION

Division Administrator

3220 W. Edgewood, Suite H

Jefferson City, MO 65109

The district advises

all railroads in the affected project area by sending a notice to the railroads' chief engineers when the project affects railroad lines, railroad yards or industrial properties belonging to the railroad. Preliminary layouts through yards or industrial areas will be discussed with the railroads to ensure their current plans are not in conflict with the proposed project. This will be done in coordination with the Multimodal Operations Division (<http://wwwi/intranet/mo/>) .

129.7 Design Public Hearings

A design public hearing, or opportunity afforded for such hearing, is required for all projects regardless of environmental classification which are on new location, require substantial amounts of new right of way, substantially change the layout or functions of connecting roadways or of the facility being improved, have a substantial adverse impact on abutting property, or otherwise have a substantial social, economic, environmental or other effect, or for which FHWA determines that a public hearing is in the public interest. Substantial amounts of right of way and substantial adverse impact on abutting property is defined as follows: total additional right of way and permanent easements greater than 20 acres (8 ha) in rural areas or 200,000 ft² (18,500 m²) in urban areas, or acquisitions of right of way or permanent easements from five or more properties. All projects that involve Section 4(f) and Section 6(f) lands will be examined to determine if a design public hearing is advisable. This criteria is considered a minimum level for which a public hearing is required. Authority to conduct the design public hearing is given with the district engineer's approval of the preliminary plans.

A hearing will be considered, even if not "required", if the impact on the traveling public, adjoining property owners and businesses in the area is considered to be substantial. Generally 3R and 4R projects do not require hearings. However, a hearing may be desirable to advise local officials, adjacent property owners and other users of the details of the project. A hearing is an opportunity to gain comment from the public concerning the improvement and it allows the department an opportunity to outline a proposed solution to an identified transportation need. Public involvement is required for defining purpose and need and for determining the range of alternatives for a project. The desirability, methods of advertising and format for these hearings are left to the discretion of the district engineer. A summary of the meeting is submitted to the State Design Engineer.

At design public hearings, the preliminary plans and other exhibits from the location study are displayed. Pertinent information about the location alternatives studied and reasons for selecting the proposed location are discussed. Details of the effect of the proposed design on individual properties are discussed. Information about design alternatives studied is also made available.

129.8 Noise Wall Public Meeting and Voting

For projects with noise impacts where noise abatement is both reasonable and feasible, a noise wall public meeting is required. Refer to EPG 127.13.10 Noise Wall Public Meeting and Voting for guidance.

129.9 Advertisement for Public Hearings

Notices concerning public hearings will be published as a legal notice in a newspaper having general circulation in the vicinity of the proposed project. Additional paid advertisements are encouraged to ensure maximum public input. [Letters to individual property owners, business owners, service providers (sheriff, police, fire, schools, Post Office, emergency, etc.) and other interest groups will be provided. Extra efforts may be necessary to ensure that minority and disadvantaged populations are aware of the process. Examples of these efforts include house-to-house contact, bulletins at kiosks, community minority liaison contacts and notices in newspaper and media outlets catering to minority and disadvantaged populations. These efforts will be documented for inclusion in environmental documents and department-wide Title VI and environmental justice compliance. The notice of public hearing specifies the date, time and place of the hearing and contains a description of the project. If the open house format is to be utilized, this procedure is explained in the notice. The notice of public hearing specifies that maps, drawings, appropriate environmental documents, other pertinent information developed by the department and written views received as a result of the coordination with other agencies or groups, will be available for public inspection. The notice also specifies that this information is available in the appropriate district office and at some other convenient location such as a courthouse, city hall or library for public inspection and/or copying. The notice of public hearing is to be published a minimum of 21 calendar days prior to the date of the hearing. A copy of the notice is to be sent to the State Design Engineer and to FHWA at the same time that it is published. The district furnishes FHWA and the Design Division (<http://wwwi/design/default.htm>) proof of publication for location public hearings.

In addition to publishing a notice of public hearing, the district provides news releases to the newspaper and electronic media at the same time as the official notice is to be published and again approximately 5 to 12 calendar days prior to the date of the hearing. The news releases generally contain the same information included in the official notice. If the district believes other methods of advertising a public hearing would help increase public attendance, these options are to be explored. Options may include direct patron mailings, flyers in public areas, signs erected in the project area or other methods.

The views of interested agencies are to be solicited in writing at the time the notice of location public hearing is published if the agencies were not involved earlier in the process.

The districts maintain a mailing list so interested agencies, local officials, groups or individuals are sent by mail a notice of the public hearing.

129.10 Advertisement for the Opportunity for a Public Hearing

If, in the judgment of the district engineer, ample evidence of the desire for a public hearing is not apparent, the district may advertise the opportunity for a public hearing. [Letters to individual property owners, business owners, service providers (sheriff, police, fire, schools, Post Office, emergency, etc.) and other interest groups will be provided. In addition to or instead of the information required for the notices and news releases described above, the notice of opportunity for a public hearing includes instructions concerning how to request a public hearing. All requests must be in writing and will be acknowledged in writing by the district engineer.

This notice is published as either a paid advertising notice or a legal notice and submitted as a news release. This notice advises the public of a deadline for the request for a public hearing. The deadline for submission of this request is 21 calendar days after the publication of the notice.

If a request is received, the district may contact the individual to discuss their concerns with the project. The person making the request is allowed 14 calendar days to withdraw their request in writing. A public hearing is held if the request is not withdrawn.

If the district receives no requests for a hearing, they document the opportunity for public hearing notice and certify that no requests were received. This documentation and certification is forwarded to the Design Division

(<http://wwwi/design/default.htm>) for both location public hearings and design public hearings. This information will be used to obtain commission approval for the location or the design of the improvement.

129.11 Procedures for Conducting Public Hearings

Public hearings are to be held at a place and time generally convenient for persons affected by the proposed undertaking. When selecting the time and location of the meeting, special consideration will be given to making the setting comfortable for all, including minority and disadvantaged populations. The district conducts the hearing with assistance from the Design Division if necessary. The hearing location selected will provide adequate accessibility for physically disabled citizens. Accessibility will also be adequate for minority and low-income populations. Special attention is paid to access from public transportation, the ability to walk to the meeting, and obstacles such as railroad tracks, crossing busy highways, etc. Two procedures may be used to conduct public hearings: the traditional formal speaker-audience format, or the open house format. The selection of format is at the discretion of the district engineer and will be based on an analysis of the project's specific conditions. This analysis will include consideration of minority and low-income populations. The recommended open house format tends to be comfortable for a wider variety of people. Where there are language barriers, efforts will be made to ensure all voices and presentations are heard and understood.

129.11.1 Formal Public Hearings

Formal public hearings consist of an opening statement, a period for statements and questions from the public, and a closing statement. Following is a list of actions and statements that will take place at all formal public hearings:

- The public hearing is conducted in a business-like manner, with questions answered as completely and unbiased as possible.
- A complete record is made, including names and addresses, for all those in attendance and those speaking.
- The opening statement includes an explanation of the purpose and need for the project. Information such as accident data, structural deficiencies, capacity problems, and public requests may be cited as justification for the project. Pertinent information about the location alternatives studied as well as major details of the proposed design are discussed. This information will describe the project's conformity with the goals and objectives of the area.
- The following statement will be made at all hearings: "This project is being processed in accordance with federal rules and regulations. Plans will be subject to review by FHWA. If federal funds are used in right of way acquisition and/or construction, the percentage of federal funds used will be in accordance with current regulations".
- The tentative schedule of right of way acquisition and construction is mentioned. It is limited to a statement that once design approval is received, the department will proceed with design and right of way acquisition and construction will take place when funds are available. A statement is included that the improvement under consideration is on the State Transportation Improvement Program (STIP).
- At any hearing for a project which requires additional right of way to accommodate the proposed facility, the following is included as a part of the opening statement: "Each person in attendance has been provided with or has available to them a brochure titled "Pathways for Progress". This brochure explains the various steps in acquisition of property required for a highway project. You will be contacted by a representative of the department at the beginning of the acquisition process and all features in this brochure will be discussed in detail with each property owner". In order that the public will be adequately informed regarding relocation assistance procedures, the following is included as a part of the opening statement, where applicable: "In addition to the brochure, a pamphlet titled "Relocation Assistance and Payment Program" has been provided or is available. This pamphlet describes assistance and benefits available to those that will be displaced by this project. This program will also be discussed individually with those being displaced as part of the acquisition process". In addition to this statement, it is necessary to discuss the number of individuals, families, businesses, etc. that may be relocated by the project under consideration and if studies indicate adequate replacement housing is available. If sufficient comparable replacement housing is not available, we

must indicate that we are committed to provide last resort housing. It is also necessary to state that no one will be displaced from their residence unless an appropriate replacement dwelling is available or provided.

129.11.1.1 Formal Location Public Hearings

The following additional actions and statements should take place during the formal location public hearing:

- The public is advised that the public hearing is being recorded and that the transcript will be studied and submitted to the Chief Engineer of MoDOT and to the Missouri Highways and Transportation Commission (<http://www.modot.mo.gov/about/commission/index.htm>) . The following statement is made: "We encourage everyone to ask questions and make their comments known. All comments received will be evaluated by the department staff and the commission in determining the final location of the project. Many factors are considered and any one of the alternate locations may be selected and approved for further plan development. The Commission will approve the selected alternative once FHWA has approved the conclusion of the NEPA process."
- All substantive written views received prior to the location public hearing must be made available to the public as part of the hearing either by display at the hearing, or by reading into the transcript. These letters may be included as part of the environmental document and displayed in that manner.
- Provision is made for acceptance of written statements and other exhibits in place of or in addition to oral statements at the time of the location public hearing. A statement is made that any additional pertinent information received within ten working days after the hearing will be made a part of the transcript and substantive comments will be addressed in the Final EIS or EA letter.
- The opening statement also includes a brief explanation of the content and availability of the environmental impact statement (EIS) or environmental assessment (EA). For projects with an environmental classification of CE, a statement is made that the proposed improvement is expected to have no significant impact on the environment and hence is categorically excluded from the need to prepare an EIS. For EA and EIS projects, at least two copies of the approved EA or Draft EIS must be available for public review at the hearing. However, to avoid vandalism and looting, the location of archaeological sites will not be disclosed to the public.
- Any significant encroachment on flood plains or wetland areas is discussed.
- The following statement is to be made at all location public hearings: "Any time after the location public hearing and before design approval, information pertaining to the proposed location and design, including the transcript, will be available upon request at the district office for public inspection and copying."
- Pertinent information about all of the location alternatives studied is discussed and shown on exhibits. All alternatives carried forward in the EA or Draft EIS as reasonable are to be given equal consideration at the hearing in terms of exhibit presentation and design detail. All alternates considered but dropped from further consideration will have pertinent information regarding this decision available for discussion at the hearing. A color sketch is provided as a handout. The approved EA or Draft EIS is also made available. An EA **must** indicate a preferred alternative. FHWA encourages designating a preferred alternative in a Draft EIS if one stands out.

129.11.1.2 Formal Design Public Hearings

The following additional actions and statements should take place during a formal design hearing:

- The public is advised that the public hearing is being recorded and that the transcript will be studied and submitted to the Chief Engineer of MoDOT and to the Missouri Highways and Transportation Commission (<http://www.modot.mo.gov/about/commission/index.htm>) . The following statement is made: "We encourage everyone to ask questions and make their comments known. All comments received will be evaluated by the department staff and the commission in determining the final design of the project. The Commission will approve the design based on comments received at this hearing and the district may then proceed with right of way and construction plans."

- All substantive written views received prior to the design public hearing must be made available to the public as part of the hearing either by display at the hearing, or by reading into the transcript.
- Provision is made for acceptance of written statements and other exhibits in place of or in addition to oral statements at the time of the location public hearing. A statement is made that any additional pertinent information received within ten working days after the hearing will be made a part of the transcript, and substantive comments will be addressed prior to Commission approval of the design.
- The following statement is to be made at all design public hearings: "Any time after the design public hearing and before start of construction, information pertaining to the location and proposed design, including the hearing transcript, will be available upon request at the district office for public inspection and copying."
- A color sketch is provided as a handout. Preliminary plans and other exhibits derived from the location study are displayed. It is also recommended that the approved final environmental document is made available for public review at the design hearing.

129.11.2 Open House Public Hearings

An open house public hearing has the same requirements as a formal public hearings except some items are included on an informational handout, since verbal opening and closing statements by department staff are not made during an open house location public hearing. The advertising is the same, except all notices and letters describe the format being used with emphasis on the optional hours during which interested persons may attend. Alternate methods of submitting comments also are included in the notice. The normal time for an open house public hearing is a weeknight other than a holiday, Monday through Thursday, from 4:00 p.m. until 7:00 p.m. These hours will accommodate persons wishing to attend during normal working hours and those wishing to attend after normal working hours. The duration of the hearing may be increased as needed if a large turnout is expected.

The site for open house public hearings is separated into areas for greeting, display, and recording comments. This may be done with a large, single room or a group of smaller rooms. One or more greeters stationed at the entrance to the hearing room or rooms ask people upon arrival to fill out an attendance card and direct them to exhibit and comment areas. Each person is given a comment sheet and an informational handout. The handout has all information normally included in the opening statement at a formal hearing. In addition, it may include a location sketch, summary of environmental documents or other detail. Return postage may be included on comment sheets for the benefit of persons desiring to submit written comments by mail. The district engineer will be present along with appropriate district and Design Division (<http://wwwi/design/default.htm>) personnel. It is recommended Design Division staff be notified of any particular issues which may call for their attendance at the hearing. Several sets of exhibits will be available in order to provide visitors ample opportunity to see the information. The exhibits of the project will be of sufficient quality and scale so property owners can clearly identify their property. It is recommended that a wide corridor be shown at the location public hearing instead of showing specific lines and design features since these are subject to change. Additional exhibits showing traffic, accident, environmental, economic, or other data will also be displayed. To avoid the potential for vandalism or looting, the location of archaeological sites will not be disclosed. Exhibits of the NEPA process and project schedule may be shown in a simple format. It is advisable to invite other agencies, cities, or counties, to be present or set up displays if they have projects going on in the area for which public questions are anticipated. Right of way personnel are stationed in a separate, clearly labeled area to discuss right of way matters. Another area is provided for submitting written comments. A separate, semi-private area is provided for the electronic recording of verbal comments with assistance from district personnel. Visitors should be reminded that written comments can be submitted up to 10 working days after the hearing.

129.11.3 Transcripts

The district is responsible for the preparation of an accurate written transcript of the oral proceedings of each public hearing. This may include the use of a tape recorder, a court recorder, or any reliable method that will assure a verbatim transcript. Shorthand notes are not considered adequate. Tapes are retained until the commission has

approved the location or the design covered at the hearing(s). Public comments expressed at the hearing but not recorded will also be noted. One copy of the transcript is prepared in the district office for submission to the Design Division for each of the following types of public hearings:

- Location
- Location and Design
- Design

The transcript is bound in a folder having contents in the following order:

- Executive Summary that describes and discusses issues identified at the hearing or during the open comment period. No recommendations are included in this summary.
- Project information handout
- Double-spaced transcript of any oral hearing proceedings
- Color location map(s) showing the alternate locations presented (location public hearing only) or the location of the recommended design (design public hearing only)
- Data pertinent to statements or exhibits used or filed in connection with the public hearing
- Data pertinent to information made available to the public prior to the public hearing
- Pertinent correspondence
- Copy of all written comments received

The following material will not be included in the hearing transcript:

- Data pertaining to newspaper advertising. This covers the descriptive notice as well as letters to newspapers requesting publication of a public hearing notice.
- Informative letters to FHWA.
- Letters to agencies concerning notification of a public hearing and listing of agencies so notified except where Section 4(f) and Section 6(f) lands are affected.
- List of names of people attending the public hearing.
- Plan sheet prints or similar large material bulky in nature unless they can be conveniently included.
- Other data such as copies of letters from the Central Office, listing of information made available to the public prior to the public hearing, etc.
- Preliminary plans used as exhibits at the public hearing.
- Right of way or relocation brochures.

Additionally, a Request for Approval of Location and/or Design of Highways is submitted with a letter of transmittal from the district engineer to the Design Division. The transmittal letter and Request for Approval of Location and/or Design of Highways are not made a part of the transcript. The transmittal letter addresses any substantive comments from the public hearing and includes the number of people who attended, recommendations, and general project information. The letter of transmittal from the district engineer will also certify that the public hearing was held in accordance with all applicable rules and regulations, and that the department has considered possible social, economic, and environmental effects of the proposed improvement together with its conformity with local planning goals and objectives.

Location public hearing and Design public hearing transcripts are submitted to the Design Division. In the event the district holds a combined location and design public hearing, the transcript will also be submitted to the Design Division. The district must receive commission approval at this stage before further development of the plans can be accomplished. For EA and EIS projects, the Design Division sends FHWA a copy of the location public hearing transcript so substantive issues to be addressed in the EA letter or Final EIS can be considered prior to submittal of the document for FHWA's approval. FHWA must approve the EA letter or Final EIS prior to Commission approval of the location. The Design Division will provide a copy of the design or the location and design hearing transcript, with executive summary, to FHWA for their review and comment. No department recommendation will be provided to FHWA at this time. They will provide a written comment to the department concerning the issues

identified as a result of the public hearing. Their comments will be considered in the development of the department's recommendations to the commission. It is desirable that the submission of the transcript and executive summary to the Design Division be made within a reasonable period (usually less than two months) after the public hearing.

Prior to submitting the transcript to the Design Division, the district will make copies of the transcript and related material available for public inspection and copying at the district office.

In the event a scheduled public hearing is not held due to lack of attendance, a letter conveying information pertaining to the scheduled hearing will suffice in lieu of a transcript.

129.12 Presentation for Location or Design Approval to the Commission

Commission approval of the location or design of an improvement is required for the following:

- The location of all projects classified as an EA or an EIS.
- The design of all projects requiring right of way or permanent easements exceeding the limits earlier defined.

A procedure governing the presentation of information to the Commission for location or design approval following a public hearing is stated below. This procedure will be followed in the case of a public hearing which is not held due to no request being received for a hearing.

- The district submits one copy of the hearing transcript, together with the executive summary, to the appropriate project development liaison engineer in the Design Division (<http://wwwi/design/default.htm>) . The transmittal letter shall include the district's recommendations concerning how to address the issues identified as a result of the public hearing.
- The Commission Backup Form (<http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Blank.dot>) and location sketch for the Commission exhibit are prepared. Both are sent to the Design Division attached to an e-mail addressed to "commissionexhibit".
- For each item placed on the monthly Commission agenda, the e-mail must indicate whether there is a potential conflict of interest (i.e., a commissioner owns property within one-mile (1.6 km) of the project). District Right of Way and Chief Counsel's Office can provide information on potential conflict of interest areas for projects within the district. In the event a possible conflict does exist, the name of the commissioner and the location of the property will be required. Once this information has been provided to the Design Division (at the time the item is sent for inclusion on the Commission's agenda), they will fill out the necessary form for the Commission Secretary and Chief Counsel's Office use. The e-mail will indicate if no conflict of interest exists.
- In order to properly schedule hearing information for presentation to the Commission for design approval, the district will provide the information to the Design Division a minimum of 3½ weeks prior to the Commission meeting. This will allow for a 2 working day review and ensure the item has been thoroughly discussed before it is placed on the Commission agenda.
- For an EA or an EIS project, the final location public hearing transcript must be received by the Design Division 30-45 days prior to the final EA or EIS document submittal to FHWA. This will be three to six months prior to the project being placed on a Commission agenda for location approval.
- If a difference of opinion develops between the Design Division and the district concerning recommendations to the Commission, the Director, the Chief Engineer, or the Asst. Chief Engineer will be consulted to reach consensus. The recommendation provided to the Commission indicates the

"DEPARTMENT'S" position and not those singularly identified as the position of the district or the Design Division.

- With the information received from the district, the Design Division will ensure the item is placed on the Commission agenda and Commission backup (<http://epg.modot.mo.gov/forms/DE-DEForms/Commission%20Backup%20Form%20Blank.dot>) is provided to the Commission. Based upon this information, the Design Division will place the item on the regular or consent portion of the meeting agenda. In doing so, a consistent format will be maintained for the Commission's benefit.
- When the item is placed on the Commission's regular agenda (due to controversy or public interest), the district engineer will attend the Commission meeting and present the item for approval. If the item is placed on the Commission's consent agenda, it is preferred the district engineer be in attendance at the meeting to answer questions from the Commission in the event it is transferred to the regular agenda.

Following Commission action, the Design Division will prepare the necessary Commission minutes.

After the Commission has approved the location of the proposed improvement, detailed design of it can begin. After the Commission has approved the design of the proposed improvement, the acquisition of right of way to construct it can begin.

129.13 Public Involvement for Stormwater

A public hearing may be requested during the public notice period for MoDOT's TS4 Site-specific State Operating Permit. The public notice will be posted on [www.modot.org/stormwater/ MoDOT's stormwater page] and emailed to media statewide when MoDOT is submitting a renewal application to the MDNR, typically every five years.

The request must give reasonable cause for holding the hearing. A public hearing will be held if there is significant technical merit and concern related to the responsibilities of MoDOT. At least 30 days prior to the hearing MoDOT will post public notice of the hearing. The hearing will be held in the geographic area appropriate to the request.

Retrieved from "http://epg.modot.org/index.php?title=Category:129_Public_Involvement"

- This page was last modified on 15 February 2017, at 11:44.

127.25 Maintenance Environmental Policies

From Engineering Policy Guide

Contents

- 1 127.25.1 Solid Waste
 - 1.1 127.25.1.1 Asbestos
 - 1.1.1 127.25.1.1.1 Asbestos and Bridge Maintenance
 - 1.2 127.25.1.2 Solid Waste
 - 1.3 127.25.1.3 Tire Management
 - 1.4 127.25.1.4 Street Sweepings
 - 1.5 127.25.1.5 Antifreeze
 - 1.6 127.25.1.6 Battery Management
 - 1.7 127.25.1.7 Disposal of Animal Carcasses
- 2 127.25.2 Hazardous Material Spills
 - 2.1 127.25.2.1 Hazardous Material Spills (Roadway) by Others
 - 2.2 127.25.2.2 MoDOT Hazardous Material Spills
- 3 127.25.3 Rest Areas
 - 3.1 127.25.3.1 Rest Area Lagoon
 - 3.2 127.25.3.2 Rest Area Drinking Water
 - 3.2.1 127.25.3.2.1 Well Drilling
- 4 127.25.4 Water Management
 - 4.1 127.25.4.1 Storm Water Regulations
 - 4.2 127.25.4.2 Maintenance Operations Impacting Streams
 - 4.3 127.25.4.3 Well Closures
- 5 127.25.5 Containers
 - 5.1 127.25.5.1 Fuel Storage Tanks
 - 5.1.1 127.25.5.1.1 Fuel Pump Calibration
 - 5.2 127.25.5.2 Herbicide Containers
 - 5.3 127.25.5.3 Empty Drums and Containers
- 6 127.25.6 Environmental Compliance
 - 6.1 127.25.6.1 Threatened or Endangered Species
 - 6.2 127.25.6.2 Tier II Reporting
- 7 127.25.7 Hazardous Waste
 - 7.1 127.25.7.1 Hazardous Waste Compliance
 - 7.2 127.25.7.2 When a Product Becomes a Waste
 - 7.3 127.25.7.3 Lead Based Paint Abatement
 - 7.4 127.25.7.4 Equipment Cleaning Fluids
 - 7.5 127.25.7.5 Used Oil
 - 7.6 127.25.7.6 Hazardous Waste Reporting
- 8 127.25.8 General
 - 8.1 127.25.8.1 Open Burning
 - 8.2 127.25.8.2 Lead Mining Chat
 - 8.2.1 127.25.8.2.1 Abrasives
 - 8.3 127.25.8.3 Sewage Disposal System
 - 8.3.1 127.25.8.3.1 Industrial and Domestic Waste Waters on Right of Way
 - 8.3.2 127.25.8.3.2 System Attachments by Others
 - 8.4 127.25.8.4 Vehicle Placarding
 - 8.5 127.25.8.5 Fugitive Dust
 - 8.6 127.25.8.6 Vehicle Painting
 - 8.7 127.25.8.7 Environment Site Assessment
 - 8.8 127.25.8.8 Salt Runoff
 - 8.8.1 127.25.8.8.1 Storage

Forms

Deer Death Report
Form and Map (Excel)

Additional Information

Top Ten Spill
Prevention Items

127.25.1 Solid Waste

127.25.1.1 Asbestos

Asbestos or possible asbestos containing material that is to be removed during remodeling, repair or demolition shall be sampled by a MoDOT Asbestos Inspector. Material that tests positive for asbestos must be removed by a permitted removal contractor and overseen by a MoDOT Asbestos Contractor Supervisor. All asbestos containing materials shall be handled according to local, state and federal regulations. Asbestos containing materials that do not have to be removed or disturbed shall be left in place. Materials found to have been damaged or become friable (crumbles easily) will be repaired or removed and replaced with non-asbestos containing material. All asbestos work must be done by qualified personnel. There are two types of notifications required by MDNR in regard to asbestos abatement and demolition. Asbestos abatement notification must be provided to MDNR at least 10 working days prior to the start of the project. Demolition or major renovation notification must be provided to MDNR at least 10 working days prior to the start of that project. The demolition notice is required even if there is no asbestos identified in the project.

Reason for Policy: 10 CSR 10-6 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf>) , Air Pollution Control Program

RSMo 643.225 - 643.620 (<http://www.moga.mo.gov/mostatutes/chapters/chapText643.html>) Air Conservation

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.1.1 Asbestos and Bridge Maintenance

MoDOT asbestos inspector will inspect bridges to determine if Asbestos Containing Material (ACM) is present on a bridge. The following guidelines will be followed when conducting bridge maintenance work renovations that impacts ACM:



1. Bridge maintenance work renovations that impacts ACM over the regulated threshold quantities of 260 linear ft., 160 ft², or 35 cu. ft.
 - MoDOT is required to notify MDNR at least ten (10) working days prior to beginning of project and submit an Asbestos Project Notification (MDNR Form MO 780-1226) and an Asbestos NESHAP Notification of Demolition and Renovation notification (MDNR form MO 780-1923).
 - MoDOT will submit an Asbestos Post-Notification (MDNR form MO 780-1225) when project is completed.
 - All ACM material removed will be packaged, mark and disposed as Regulated Asbestos Containing Material (RACM) in a landfill that accepts RACM.
 - MoDOT employees who work on ACM on bridges will be certified Asbestos Supervisors or Workers by MDNR.
2. Bridge maintenance work renovations that impacts ACM under the regulated threshold quantities of 160 ft², 260 linear ft., or 35 cu. ft.
 - MoDOT is not required to notify MDNR.
 - MoDOT employees who work on ACM on bridges will be certified Asbestos Supervisors or Workers by MDNR.
 - All ACM material removed will be packaged, marked and disposed of in an approved sanitary landfill that accepts ACM.
3. When conducting emergency Bridge maintenance work renovations on a bridge that has not been inspected for ACM or will impact ACM over the regulated threshold:
 - Contact MDNR and notify them of the Bridge related emergency.
 - Follow guidance for Bridge Maintenance renovations over the regulated threshold quantities. See item #1 above.
4. MoDOT employees will follow MoDOT's Respiratory Protection Policy when working on bridges.
5. MoDOT employees will follow MoDOT's Asbestos Protection Policy when working on bridges with ACM.
6. MoDOT will submit one Asbestos Contractor Registration Application (MDNR Form MO 780-1224) annually for MoDOT bridge maintenance work renovations that occurs statewide.

Reason for Policy: EPA Applicability Determination April 2015 (<https://cfpub.epa.gov/adi/>) , 10 CSR 10-6,

Effective Date: 7/1/16

Revision Dates:

127.25.1.2 Solid Waste

The department shall dispose of garbage, refuse and other discarded material in a permitted sanitary landfill. Materials such as whole tires, batteries, appliances, used oil and hazardous wastes are prohibited from being disposed of in a sanitary landfill and shall be recycled as regulations dictate. Construction and Demolition Waste (<http://dnr.mo.gov/env/cdwaste.htm>) also considered solid waste from older buildings being renovated or demolished to make room for newer, more modern buildings. Properly managing the waste during the demolition will prevent threats to human health and the environment.

Reason for Policy: RSMo 260.200 (<http://www.moga.mo.gov/mostatutes/stathtml/26000002001.html>) - 260.345 Environmental Control

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.3 Tire Management

Waste tires unsuitable for sale or recapping shall be disposed of under state contract CCO form MT15 (<http://sp/sites/eagreements/SitePages/Home.aspx>) . Contact an Environmental Specialist for current contract information. Burning tires or tire pieces is prohibited. Tires and tire pieces shall be stored in a manner that avoids providing a mosquito-breeding site. Twenty-five or more whole tires stored at any one site must be covered. Maintain an inventory of less than 500 whole tires at any one site, at any one time, unless they are loaded on a truck for disposal.

Reason for Policy: 10 CSR 80-8.010 - 80-8.040 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c80-8.pdf>) Solid Waste Management

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.4 Street Sweepings

Street sweepings are considered solid waste by the Missouri Department of Natural Resources (MDNR) (<http://www.dnr.mo.gov/>) . The sweepings must be disposed of in a permitted sanitary landfill. An exception from disposal in a landfill has been granted by MDNR. To qualify for the exemption, the street sweepings must meet the beneficial use requirements as established by MDNR.

To qualify for the beneficial use exception, the sweepings must be composed of grit and dirt from the roadway surface and only minor amounts of trash, litter or automotive parts can be present in the sweepings. The sweepings can contain asphaltic concrete materials as clarified in the April 2010 MDNR approval letter.

Street sweepings need to be processed or screened to remove trash, litter and other debris. If the screenings still contain excessive amounts of trash, litter or other debris, additional processing will be required; or the materials will need to be disposed in a landfill. All of the trash, litter and other debris removed by the screening process shall be disposed of in a sanitary landfill.

MDNR Approval Letters and Street Sweeping Sampling Information

Street Sweep MDNR 2007 letter
Street Sweep MDNR 2010 letter
Street Sweep Guidance/Beneficial

Sampling and testing of the screened grit and dirt material is required by MDNR. At least one sample must be collected for every 500 cubic yards of screened material created. The guidance in the sampling protocol must be followed. This includes proper sample collection, preservation and analysis by MoDOT's chemical laboratory. Questions regarding the sampling protocol should be directed to the appropriate Environmental Specialist in Design Division (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) .

Use Approval
Street Sweep Sampling Protocol

A copy of the sample results must be kept on file at the Maintenance building where the screenings were processed and a copy of the sample results needs to be provided to the Environment section of the Design Division.

Reason for Policy: 10 CSR 80 (<http://www.sos.mo.gov/adrules/csr/current/10csr/10csr.asp#10-80>) Solid Waste Management Regulations and RSMo 644 (<http://www.moga.mo.gov/mostatutes/chapters/chapText644.html>) Missouri Clean Water Law.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.5 Antifreeze

In the ANTIFREEZE WASTE MANAGEMENT GUIDE DNR Publication 114 (<http://dnr.mo.gov/pubs/pub114.htm>) , waste antifreeze is not a listed hazardous waste under the federal hazardous waste regulations in 40 Code of Federal Regulations (CFR) 261 Subpart D (<https://www.law.cornell.edu/cfr/text/40/part-261/subpart-D>) , but antifreeze may contain metals, particularly lead, and other substances that would cause it to be classified as a characteristic hazardous waste (40 CFR 261 Subpart C (<http://www.gpo.gov/fdsys/pkg/CFR-2012-title40-vol27/xml/CFR-2012-title40-vol27-part261-subpartC.xml>)). Spent antifreeze from vehicle maintenance activities shall be collected and processed through a MoDOT antifreeze recycler. Antifreeze that is not reused in the vehicle must be sent to a recycler that accepts antifreeze. Antifreeze may never be discharged to storm sewers, septic systems, streams or on the ground.

Reason for Policy: 10 CSR 25-5.262 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-5.pdf>) , Hazardous Waste Management Program. Reduce antifreeze cost and disposal cost.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.6 Battery Management

All non-rechargeable batteries shall be managed as a solid waste. All rechargeable batteries shall be recycled with an approved recycler. Place cracked lead acid batteries in an acid safe container and contact your battery recycler or Environmental Specialist for specific information. All lead acid batteries should be inside secondary containment.

Reason for Policy: 40 CFR 266.80 (<http://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol27/pdf/CFR-2011-title40-vol27-sec266-80.pdf>) Rechargeable batteries contain specific hazardous components such as nickel, cadmium, mercury, lead and sulfuric acid that cause the batteries to be a hazardous waste unless they are sent to a recycler, DNR publication 2058 (<http://dnr.mo.gov/pubs/pub2058.htm>) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.1.7 Disposal of Animal Carcasses

Animal carcasses found on MoDOT right of way shall be disposed of properly. Options for disposal are listed below under Accepted Disposal Practices. It is the supervisor's responsibility to choose the option that best suits the needs of their particular area. Disposal practices other than the accepted practices listed below will require State Maintenance Engineer approval.

Since the distribution of a 1987 letter of agreement, MoDOT has reported all deer killed on its right of way to the Missouri Department of Conservation (MDC). Each deer found on MoDOT right of way is to be reported to the district office and the information logged on the Deer Death Report Form and Map (Excel). The monthly log sheets are to be forwarded to the Maintenance Operations Functional Unit at General Headquarters by the 15th of the following month. The information will be forwarded to the MDC.

Accepted Disposal Practices

- Option 1 - Bury the carcass on highway right of way, provided it is not prohibited by local ordinances, and not in a waterway. The carcass should be buried at a minimum depth of 30 inches. Call 800-DIG-RITE (800-344-7483) prior to digging.
- Option 2 - Dispose of the animal carcass at a state-approved sanitary landfill, with the landfill operator's approval. There will likely be a fee associated with this option.
- Option 3 - Dispose of the carcass in an animal compost bin, which can be built at a maintenance facility. The procedures for building composting units shall meet the guidelines established by the University of Missouri as outlined in DNR publication 1250 (<http://dnr.mo.gov/pubs/pub1250.htm>) .
- Option 4 - Dispose of the carcass at a site and in a manner pre-approved by the MDC. Written approval from MDC is required.
- Option 5 - Where available, the carcass may be taken to a city or county animal control facility equipped to dispose of animal carcasses.
- Option 6 - Missouri law allows an individual who has struck and killed a deer with their vehicle to claim the deer carcass if written authorization to possess the deer is granted by a MDC Agent.
- Option 7 - Disposal of domestic animal carcasses by the owner is allowed provided the owner can be identified in a timely manner. If there are any identifying marks on the carcass, department personnel shall attempt to notify the owner.

Reason for Policy: RSMo 269 (<http://www.moga.mo.gov/mostatutes/chapters/chapText269.html>) Environmental Control 40 CFR 30 (http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr30_main_02.tpl) Federal Endangered Species Act, DNR Solid Waste Program and Water Pollution Control Program, MoDOT liability.

Effective Date: 6/1/99

Revision Date: 10/27/15

127.25.2 Hazardous Material Spills

127.25.2.1 Hazardous Material Spills (Roadway) by Others

MoDOT may become responsible for abandoned drums and containers, illegal dumped chemicals and accidental releases of hazardous materials on department property. When hazardous material spills and incidents are discovered on department property, MoDOT personnel shall follow the department's *Hazardous Materials Response Plan* to assure the material is handled properly. Reporting will be made to the Missouri Department of Natural Resources (MDNR) Environmental Emergency Response (EER) (573) 634-2436 in accordance with MoDOT procedures and Missouri RSMo 260.500 (<http://www.moga.mo.gov/mostatutes/stathtml/26000005001.html>) through 260.550.

Note: All unknown materials and containers will be treated as hazardous waste until proven otherwise. When an unknown material or a known hazardous material is discovered on the department's property, the District Hazardous Material Coordinator (DHMC) will be notified. The DHMC contact list is available. The DHMC will call the MoDOT Environmental Section, (573) 526-4778, and the MDNR ERR 24 hour hotline number, (573) 634-2436, and report all information available to both. It will then be the responsibility of the MDNR ERR to determine if the material is hazardous. If DNR makes the declaration of a "hazardous substance emergency", they will (1) respond with their own resources, or (2) contact the contractor to respond to the incident. In either case, either party will conduct the initial containerization and remove the material from the ROW to the nearest available storage facility, while any additional waste stream profile analysis is performed. MoDOT staff will arrange for any required shipment, disposal and reporting once waste stream profiling is complete.

In the event the abandoned container is neither leaking nor bulging, but is located within the clear zone, then the same contact protocol would apply as specified above. The only exception would be if MDNR were unable to respond immediately to the incident (due to lack of personnel availability, etc.), then MoDOT shall contact the appropriate emergency response contractor as specified in our Hazardous Substance Cleanup & Disposal Services OA contract (<http://archive.oea.mo.gov/purch/oa/c313018.pdf>) to ensure a timely response.

If a responsible party cannot be identified, then the response, characterization and disposal costs would become the responsibility of MoDOT (for either hazardous or non-hazardous substance responses). In those instances where an owner (responsible party) can be identified, MoDOT will seek cost recovery from the owner. If there has been a release, it will be necessary to coordinate with district Traffic personnel to write a permit to the responsible party or the emergency response contractor to allow cleanup on department property.

Note: Discovery of suspect mobile meth labs shall follow a variation of this process, as outlined in "Publication for Dealing with Mobile Meth Labs", due to the law enforcement aspect associated with this material.

Reason for Policy: RSMo 260.500 - 260.550 (<http://www.moga.mo.gov/mostatutes/stathtml/26000005001.html>) Environmental Control 40 CFR 260 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr260_main_02.tpl) - 261, MoDOT liability

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.2.2 MoDOT Hazardous Material Spills

Hazardous material spills, and spills of other materials that leave MoDOT and enter waters of the state from MoDOT operations are the responsibility of the Department and will be reported to the MDNR ERR 24 hour hot line number immediately by the first Department employee to discover the spill. That employee will also notify their supervisor and the DHMC. An environmental specialist will also be notified of the spill. MoDOT employees will take immediate action to contain the release and clean up spilled material. Reporting will be made to the Missouri Department of Natural Resources (MDNR) Environmental Emergency Response (ERR) 573-634-2436 in accordance with MoDOT procedures and Missouri RSMo 260.500 (<http://www.moga.mo.gov/mostatutes/stathtml/26000005001.html>) through 260.550. If any of the material spilled comes in contact with waters of the state (creeks, springs, rivers, groundwater or ponds) the incident shall also immediately be reported to the National Response Center (<http://www2.epa.gov/emergency-response/national-response-center>) (NRC) at 800-424-8802. Incidents during the normal working day should be reported to the district as soon as possible. The District office should report to the Maintenance division as soon as possible. Should an incident occur after normal working hours, information should be telephoned to available maintenance personnel, as well as the pertinent Environmental Specialist in Design Division (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) . Design Division environmental contacts are also referenced in the maintenance facility SPCC plans.

**Top Ten Spill
Prevention Items**

Reason for Policy: RSMo 260.500 (<http://www.moga.mo.gov/mostatutes/stathtml/26000005001.html>) - 260.550 Environmental Control

Effective Date: 6/1/99

Revision Dates: 10/27/15, 8/4/16

127.25.3 Rest Areas

127.25.3.1 Rest Area Lagoon

All rest area lagoons shall have a current National Pollution Discharge Elimination System (NPDES) permit (<http://www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm>) . These permits require the department to submit discharge samples results on a regular basis to the Missouri Department of Natural Resources. The department will comply with all requirements of the (NPDES) permits. Application for renewal shall be submitted to MDNR every five years at least 180 days prior to the expiration date of the permit. All NPDES permits must be kept current. The NPDES permit describes the limits and requirements for each specific site. These requirements include the discharge limits, frequency of sampling, location of sampling and where sample results are to be submitted. All reporting requirements and sample collection will be in compliance with the NPDES permit. A copy of the permit shall be readily available to the person who conducts sampling and report submittal.

Reason for Policy: RSMo 644 (<http://www.moga.mo.gov/mostatutes/chapters/chapText644.html>) Water Pollution, Federal Water Pollution Control Act, Public Law 92-500, 92nd Congress

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.3.2 Rest Area Drinking Water

All rest areas that are using on-site wells as the source of drinking water shall have a valid operating permit issued by the Missouri Department of Natural Resources (MDNR) Public Drinking Water Program (PDWP). Operation and maintenance of these wells shall be in accordance with the MDNR-PDWP rules and regulations pertaining to drinking water supplies. Rest areas that are served by a municipal or public water supply shall adhere to specific rules and regulations established by the water supplier concerning operation and maintenance of the water distribution system. For additional information see EPG 127.25.4.3 Well Closures and EPG 127.25.3.2.1 Well Drilling.

Reason for Policy: 10 CSR 60-1.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c60-1.pdf>) Public Drinking Water

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.3.2.1 Well Drilling

The following procedures are established for well drilling:

- The district office shall request the Department of Natural Resources (DNR), Research and Technical Information Division, Rolla, Mo., to advise the district office concerning the expected depth of the proposed well and the estimated casing depth.
- The district office will use the "Standard Bid Form - Well Drilling" to receive bids for the work from only licensed well drillers.
- The district shall appoint an employee who is familiar with well drilling to make regular inspections of the work in progress.

For additional information see EPG 127.25.3.2 Rest Area Drinking Water and EPG 127.25.4.3 Well Closures.

Reason for Policy: RSMo 256.000-256.640 (<http://www.moga.mo.gov/mostatutes/chaptersIndex/ChaptIndex256.html>)

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.4 Water Management

127.25.4.1 Storm Water Regulations

MoDOT activities disturbing one acre or more of total land area require storm water permit authorization from the Missouri Department of Natural Resources (MDNR). This includes many construction and maintenance grading operations. The "MoDOT Operating Permit for Land Disturbance" from the MDNR authorizes these MoDOT grading activities so long as a site-specific storm water pollution prevention plan (SWPPP) has been developed for the activity prior to commencing land disturbance. Some minimal impact activities, such as narrow linear, strip or ribbon construction or maintenance activities such as cleaning or routine maintenance of roadside ditches are exempt from the storm water permit requirements. Contact the MoDOT Stormwater Compliance Coordinator (<http://mysite/Person.aspx?accountname=MODOTDS%5Ckopi1>) if you have questions.

Additional Form Available
Missouri State Operating Permit for Land Disturbance
(<http://dnr.mo.gov/env/wpp/permits/issued/docs/R100000.pdf>)
Additional Information
June 2012 Changes in the MO State Operating Permit for Land Disturbance

Note: The MDNR defines storm water as storm water runoff, snow melt runoff, surface runoff and drainage.

Reason for Policy: 10 CSR 20-6.200 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c20-6.pdf>) , page 44, Missouri Department of Natural Resources, Water Pollution Control Program

Effective Date: 3/31/12

Revision Dates: 10/27/15

127.25.4.2 Maintenance Operations Impacting Streams

Activities in most streams are regulated by the U.S. Army Corps of Engineers (COE) and require 404 Permits (http://epg.modot.org/index.php?title=127.4_Wetlands_and_Streams) . Districts shall contact the local COE Office or their wetland specialist prior to beginning any work in streams. The necessary permits for removal or placement of materials in the stream shall be obtained from the COE prior to conducting the work, unless emergency authorization has been given by the COE to do the work. Technical assistance can be obtained from the Wetland Specialist (http://sharepoint/sites/de/environmental_historic_pres/Wetlands/Wetland%20Staff%20Assignments.pdf) in applying for a COE 404 permit. (Use the Request for Environmental Services Database (<http://res/Pages/Start.aspx>) for STIP jobs or contact your wetland specialist for typical maintenance projects.)

For additional information see Activities Requiring Permits
(<http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/Activities%20Requiring%20Permits%20Fact%20Sheet%20-%20Apr%202015.pdf>) .

Reason for Policy

The specific regulatory authority for the COE is based on the following laws: Clean Water Act-Section 404 (<http://water.epa.gov/lawsregs/guidance/wetlands/sec404.cfm>) ; Water Quality Certification-Section 401 (<http://dnr.mo.gov/env/wpp/401/index.html>) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.4.3 Well Closures

The proper abandonment of water wells is imperative to the protection of ground water. All wells not in use or planned to be used shall be properly closed to comply with the Water Drillers Act. A permitted water well, pump installer, monitoring well or heat pump installer shall oversee the closures. Contact an environmental specialist (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) for guidance in well closures. See EPG 127.25.3.2 Rest Area Drinking Water and EPG 127.25.3.2.1 Well Drilling.

Reason for Policy: RSMo 256.000 - 256.637 (<http://www.moga.mo.gov/mostatutes/chaptersIndex/ChaptIndex256.html>) Geology, Water Resources and Geodetic survey 10 CSR 23–3.110 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c23-3.pdf>)

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.5 Containers

127.25.5.1 Fuel Storage Tanks

Underground fuel storage tanks and their piping are required to have operational, approved leak, corrosion and overflow protection and, when necessary, vapor controls. A tank registration form shall be submitted to the Missouri Department of Natural Resources within 30 days of bringing a tank into use and when a change is made to the tank or ancillary equipment.

All above ground tanks shall be labeled as to their contents. Any facility that has any kind of oil storage capacity (55 gallons or larger containers) that totals 1320 gallons aggregate, is required to have a SPCC plan. All above ground tanks containing oil-based product are required to have secondary containment with sufficient capacity to hold the largest container plus the maximum expected rainfall. The plan must be made available to an EPA inspector if requested during an on-site inspection.

Tanks that exceed the minimum reportable quantity of hazardous material require an NFPA 704 Hazard Communication sign. For additional information see EPG 127.25.5.1.1 Fuel Pump Calibration.

Reason for Policy: 40 CFR 112 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr112_main_02.tpl)

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.5.1.1 Fuel Pump Calibration

Fuel pumps shall be calibrated annually except for those that have a history of reporting errors, or when normal tracking of petroleum usage indicates that there is a problem. Those pumps that are showing unacceptable variances should be calibrated as needed and corrections made until the problem is solved or the pump is replaced.

For additional information see EPG 127.25.5.1 Fuel Storage Tanks.

Reason for Policy: MoDOT inventory requirement to eliminate petroleum theft.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.5.2 Herbicide Containers

Instructions on container labels shall be followed for storage, use and disposal of containers and their contents. Empty herbicide containers shall be triple rinsed with water and the rinsate reused in mixing operations. The container shall be returned to the supplier or disposed of in a permitted sanitary landfill or sent to a recycler. To dispose of containers containing some herbicide material or an out of specification herbicide, contact an Environmental Specialist (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) for assistance.

Reason for Policy: RSMo 260 (<http://www.moga.mo.gov/mostatutes/chapters/chapText260.html>) Environmental Control, RSMo 281.220 - 281.310 (<http://www.moga.mo.gov/mostatutes/stathtml/28100002201.html>) Pesticides

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.5.3 Empty Drums and Containers

All empty (less than an inch of product remaining) containers, including 55 gallon drums, shall have all openings closed with containers stored on their sides to prevent rainwater from mixing with product residues.

Reason for Policy: 40 CFR 260 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr260_main_02.tpl) -261. Prevent the formation of large quantities of used products that require complying with Hazardous Waste Regulation

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.6 Environmental Compliance

127.25.6.1 Threatened or Endangered Species

All MoDOT Maintenance activities shall be conducted in a manner that does not impact any federally or state listed threatened or endangered species or their critical habitat. If an activity will impact a listed species, MoDOT must conduct formal consultation with the U.S. Fish and Wildlife Service and obtain a Biological Opinion prior to

conducting the activity.

Prior to starting any new activities (mowing, spraying, etc.) or changing methods for conducting established activities maintenance personnel should contact Chris Shulse at (573) 526-6678 or Bree McMurray at (573) 526-0606 to determine if the activity will impact any rare species or critical habitat.

Reason for Policy: 50 CFR 17 (<http://www.gpo.gov/fdsys/pkg/CFR-2002-title50-vol1/pdf/CFR-2002-title50-vol1-sec17-3.pdf>) Endangered Species Act, 3 CSR 10-4.111 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/3csr/3c10-4.pdf>) , State Endangered Species Rule

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.6.2 Tier II Reporting

A copy of the Tier II Reporting form shall be clearly posted on a bulletin board in each maintenance building. Tier II refers to state and federal Emergency Planning Community Right-to-Know Act (EPCRA) (<http://dnr.mo.gov/env/hwp/enf/epcra.htm>) .

Reason for Policy: 292.605 (<http://www.moga.mo.gov/mostatutes/stathtml/29200006051.html>) Missouri Emergency Planning and Community Right-to-Know Act

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7 Hazardous Waste

127.25.7.1 Hazardous Waste Compliance

The department shall comply with all Federal Resource Conservation and Recovery Act (RCRA) and Missouri Department of Natural Resources (MDNR) regulations regarding waste materials. This includes the generation, transportation, storage, and disposal of hazardous waste. The Department of Natural Resources' Hazardous Waste Program's Compliance and Enforcement Section (<http://dnr.mo.gov/env/hwp/enf/>) works to ensure compliance with hazardous waste laws. If you have reason to think your site or location is producing a hazardous waste you should contact the district Hazardous Material Spill Coordinator or an Environmental Specialist in Design division.

Reason for Policy: 10 CSR 25-1.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-1.pdf>) and 10 CSR 25-14.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-14.pdf>) , Missouri Hazardous Waste Management Regulations, RSMo. 260 (<http://www.moga.mo.gov/mostatutes/chapters/chapText260.html>) , 40 CFR 260 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr260_main_02.tpl) - 265 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr265_main_02.tpl) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7.2 When a Product Becomes a Waste

Generators must use products for their intended purpose. A product can become a waste if a facility does not properly store the material or the product is beyond its shelf life. If a generator is no longer using the product, it must be properly disposed and not abandoned or stored. A facility storing a material that is a hazardous waste must comply with Missouri's hazardous waste regulations.

Missouri Department of Natural Resources has produced the Waste or Product Determination Guidance publication 1349 (<http://dnr.mo.gov/pubs/pub1349.htm>) to provide criteria to consider when a product becomes a waste.

Reason for Policy: 10 CSR 25-1.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-1.pdf>) and 10 CSR 25-14.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-14.pdf>) , Missouri Hazardous Waste Management Regulations, RSMo. 260 (<http://www.moga.mo.gov/mostatutes/chapters/chapText260.html>) , 40 CFR 260 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr260_main_02.tpl) - 265 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr265_main_02.tpl) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7.3 Lead Based Paint Abatement

The following activities involving lead paint abatement currently require licensing of personnel and project notification to the Department of Health & Senior Services (DHSS):

1. Any testing or identification of lead-based paint on the surface of structures,
2. Determinations of whether a painted structure is a lead hazard because of deteriorated paint, and
3. Performance of lead abatement activities.

MoDOT has entered into a Memorandum of Understanding (MOU) (http://www.modot.org/business/contractor_resources/documents/MOUBetweenMoDOTandDHSS.pdf) with the DHSS that stipulates the above requirements will be followed for all MoDOT-let lead abatement projects. Specific requirements include:

1. All contractors and subcontractors performing lead abatement activities must be licensed as Missouri lead abatement contractors. Additionally, employees of the contractors performing lead abatement activities are required to be licensed as Missouri lead abatement supervisor(s) and/or workers,
2. The MoDOT Resident Engineer (RE) shall provide notification to DHSS through the submittal of a lead abatement project funding agency notification form which is required to be submitted 10 days prior to the onset of lead abatement projects, and
3. The contractor shall also provide notification to DHSS (http://www.modot.org/business/contractor_resources/documents/ContractorInformationPacketofLeadWorkActivities.pdf) through the submittal of a lead abatement project notification form which is required to be submitted 10 days prior to the onset of lead abatement projects.

Lead based paint removed from any surface is considered a hazardous waste. Lead based paint removed from steel structures or buildings shall be containerized, labeled and disposed of at an approved hazardous waste facility. In some instances, the lead paint and blast material may be recycled and exempted as a hazardous waste. Contact an Environmental Specialist (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) for assistance or additional information.

Reason for Policy: RSMo. 260-265 (<http://www.moga.mo.gov/mostatutes/chapters/chapText260.html>) and 40 CFR 268 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr268_main_02.tpl) , 10 CSR 25-4.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-4.pdf>) , Hazardous Waste Management. RSMo 701.300-701.332 (<http://www.moga.mo.gov/mostatutes/stathtml/70100003001.html>) and 19 CSR 30-70.600(19) (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/19csr/19c30-70.pdf>) , Lead Abatement and Assessment Licensing, Training Accreditation.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7.4 Equipment Cleaning Fluids

The department shall make every effort to purchase fluids that do not exhibit any characteristics of hazardous materials which would result in the generation of a hazardous waste when used. These characteristics include the following:

- A flash point of 140° Fahrenheit or less
- Corrosive, a pH of equal to or less than 2 or equal to or greater than 12.5
- Reacts violently with water
- Listed as a toxic hazardous waste
- Products containing chlorinated components

All efforts are made to identify products that are not only safe for the environment but our employees also. The approved products list (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Waste%20Minimization%20Info/Approved%20environmentally%20friendly%20products.doc) outlines those products which meet the objectives for both environmental compliance and worker safety. Some product review (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Waste%20Minimization%20Info/CRC%20GREEN%20Product%20Review.pdf) information is also available.

Reason for Policy: Clean Water Act, Solid Waste Law, Hazardous Waste Law. MoDOT desires to produce as few hazardous wastes as possible. Chlorinated solvents pose a health risk to employees. Contact your Environmental Specialist (http://sharepoint/sites/de/environmental_historic_pres/Hazardous%20Waste1/Haz%20Waste%20Staff%20Assignments.pdf) for more information.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7.5 Used Oil

The department shall store used oil, prior to shipment off-site, in containers that are in good condition, void of leaks and clearly labeled as used oil. All oil storage tanks are required to be included in the SPCC plan and have secondary containment with sufficient capacity to hold the largest container plus the maximum expected rainfall.

NOTE: Used petroleum fluids such as gear lube, transmission oil and hydraulic oil are defined as used oils. **Mixing solvents or antifreeze with used oil is strictly prohibited.** Records of contracts, shipper name and identification number, dates of shipment, quantity and type of oil and the processor's name and permit number shall be kept on file. Additional information on regulation and disposal of used oil (<http://dnr.mo.gov/pubs/pub153.htm>) is available through DNR.

Reason for Policy: 10 CSR 25-11 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-11.pdf>) , Hazardous Waste Program.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.7.6 Hazardous Waste Reporting

The department must file a quarterly summary report (<http://dnr.mo.gov/forms/780-1097.pdf>) for all MoDOT hazardous waste shipments from the large quantity generator sites with the Missouri Department of Natural Resources (MDNR). Annual reports are required for small quantity and one-time shipment sites. Following receipt of a copy of the hazardous waste manifest from the hazardous waste disposal facility, the Environmental Specialist shall forward a copy of the manifest to both the district hazardous materials spill coordinator and Central Office Design. If the manifest is not received from the hazardous waste facility within 45 days, an exception report must be filed with MDNR.

Reason for Policy: 10 CSR 25-5.262 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-5.pdf>) Missouri Hazardous Waste Management Regulations.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8 General

127.25.8.1 Open Burning

There shall be no open burning of trade waste or refuse generated by the department at any of its facilities except for open burning of tree trunks, limbs and vegetation at the point of generation, unless permitted. Restrictions concerning open burning:

- 10 CSR 10-2.100 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-2.pdf>) Kansas City Metropolitan Area
- 10 CSR 10-3.030 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-3.pdf>) Out State Missouri
- 10 CSR 10-4.090 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-4.pdf>) Springfield Green County Area
- 10 CSR 10-5.070 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-5.pdf>) St. Louis Metropolitan Area

Contact individual county planning and zoning offices for areas requiring compliance. Trade wastes are defined as solid, liquid, or gaseous material resulting from construction or the prosecution of any business, trade or industry or any demolition operations including, but not limited to cardboard, plastics, cartons, grease, oil, chemicals or cinders. Trade wastes include scrap lumber and wooden shipping pallets. Refuse is defined as garbage, rubbish, trade waste, leaves, salvageable material, agricultural wastes or other wastes.

Reason for Policy: Comply with State Regulations Air Pollution Control Law and Regulations 10 CSR 10-6 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf>) , Air Pollution Control Program RSMo 643 (<http://www.moga.mo.gov/mostatutes/chapters/chapText643.html>) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.2 Lead Mining Chat

Lead mining chat encapsulated in asphalt or concrete, may be used for highway construction. Special requirements apply to chat from the Tri-State Mining District (Jasper, Newton, Lawrence and Barry Counties in southwest Missouri) as referenced in . Refer to Missouri Standard Specifications for Highway Construction 1001.12 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=14) . For additional information see EPG 127.25.8.2.1 Abrasives.

Reason for Policy: MDH Health Study established to protect the health of workers and persons living along roadways. Air Pollution Control Law and Regulations 10 CSR 10-6, Air Pollution Control Program, RSMo 643 (<http://www.moga.mo.gov/mostatutes/chapters/chapText643.html>) , 40 CFR 260-265 (http://www.ecfr.gov/cgi-bin/text-id?tpl=/ecfrbrowse/Title40/40cfr260_main_02.tpl) , 40 CFR 268 (http://www.ecfr.gov/cgi-bin/text-id?tpl=/ecfrbrowse/Title40/40cfr268_main_02.tpl) , RSMo 260 (<http://www.moga.mo.gov/mostatutes/chapters/chapText260.html>) , 10 CSR 25-4.10 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c25-4.pdf>) .

Effective Date: 8/28/2015

Revision Dates:

127.25.8.2.1 Abrasives

The maximum aggregate size for abrasives shall not exceed 3/8 inch. Lead mining chat (within established limits) may be used for general maintenance purposes. See 127.25.8.2 Lead Mining Chat, for requirements for chat from the Tri-State Mining District. See Missouri Standard Specifications for Highway Construction Sec 1001.12 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=14) for established lead limits in mining by-product aggregates.

For additional information see EPG 127.25.8.2 Lead Mining Chat.

Reason for Policy: Experience has shown that an aggregate size larger than 3/8 in. is ineffective and contributes to broken windshields. Mine tailings may contain environmentally unsafe materials.

Effective Date: 6/1/99

Revision Dates: 6/17/03, 9/25/15

127.25.8.3 Sewage Disposal System

Where a sewage system at a present maintenance site is being modified or when a sewage system is being designed for a new facility, the department shall consider the feasibility of connecting onto a publicly owned waste water treatment plant (POTW). If it is not economically feasible to connect to a POTW, an on-site sewage treatment system shall be considered. The required construction permit (<http://dnr.mo.gov/forms/780-2189-f.pdf>) shall be obtained from the Missouri Department of Health or the Missouri Department of Natural Resources, Water Pollution Control Program, prior to construction. For additional information see EPG 127.25.8.3.1 Industrial and Domestic Waste Waters on Right of Way.

Reason for Policy: RSMo 701.025 - 701.059 (<http://www.moga.mo.gov/mostatutes/stathtml/70100000251.HTML>) State Standards, RSMo 644 (<http://www.moga.mo.gov/mostatutes/chapters/chapText644.html>) Water Pollution Control Program, Federal Clean Water Act 33 U.S.C. 1251-1387 (<http://www.gpo.gov/fdsys/granule/USCODE-2011-title33/USCODE-2011-title33-chap26-subchap1-sec1251/content-detail.html>) .

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.3.1 Industrial and Domestic Waste Waters on Right of Way

Sewage and waste shall be disposed of by discharging into a sewer system regulated pursuant to chapter 644, RSMo, or shall be disposed of by discharging into an on-site sewage disposal system operated as defined by rules promulgated pursuant to sections 701.025 to 701.059, RSMo. Any person installing on-site sewage disposal systems shall be registered to do so by the Missouri Department of Health and Senior Services (<http://health.mo.gov/index.php>) .

Private homeowners are regulated by the Missouri Department of Health and Senior Services. The Missouri Department of Health and Senior Services is to be contacted when wastewater discharge from private homeowners is found on right of way. If a property owner requires assistance in containing effluent, they should be directed to the Department of Health for assistance.

Commercial businesses and industries are regulated by MDNR (<http://dnr.mo.gov/>) . When wastewater discharge from a regulated entity is discovered on MoDOT right of way, the Environmental Specialist will contact MDNR to determine if the commercial business or industry has a valid operating permit issued by MDNR to discharge effluent.

The Environmental Specialist will request MDNR to take whatever legal action necessary concerning any business or industry that does not have a valid permit from MDNR to discharge effluent to the highway right of way.

For additional information see EPG 127.25.3.1 Rest Area Lagoon, EPG 127.25.8.3 Sewage Disposal System and EPG 127.25.8.3.2 System Attachments by Others.

Reason for Policy: RSMo. 701 (<http://www.moga.mo.gov/mostatutes/chapters/chapText701.html>)

Effective Dates: 6/1/99

Revision Dates: 12/27/12, 10/27/15

127.25.8.3.2 System Attachments by Others

Piped connections to the drainage system are prohibited unless approved by the district engineer. In situations where connections are permitted, plans and specifications are required to meet MoDOT specifications. If approved, the work shall be done under an approved permit and/or a Missouri Highway and Transportation Commission Agreement. Attachments to bridges and large box culverts that qualify as bridges should be referred to the Bridge Division for review. Connections to MoDOT's drainage system should be reviewed for compliance under MoDOT's MS4 stormwater permit.

For additional information see EPG 127.25.8.3.1 Industrial and Domestic Waste Waters on Right of Way and EPG 127.29.5 MCM 3.

Reason for Policy: Protect MoDOT from possible litigation. Protect the current drainage system.

Effective Date: 6/1/99

Revision Dates: 12/27/12, 10/27/15, 11/30/15

127.25.8.4 Vehicle Placarding

Department vehicles transporting regulated quantities of hazardous waste shall be placarded. MoDOT is exempt from placarding asphalt distributors and product shipments.

Reason for Policy: 49 CFR 105 (<http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=68a3027b802cf7b31b57de42b86e7dee;rgn=div5;view=text;node=49%3A2.1.1.1.2;idno=49;cc=ecfr>) -177 U.S.DOT, 10 CSR 25-6.010 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf>) , Missouri Hazardous Waste Regulations

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.5 Fugitive Dust

The department shall operate in a manner that minimizes and/or prevents fugitive dust from going beyond MoDOT property lines or off right of way. Dust from operations such as concrete sawing, crack and joint repair, street sweeping and roadway rotomilling shall be contained on department property.

Reason for Policy: 10 CSR 10-6.170 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf>) , Air Pollution Control Program. Provide driving conditions free from dust obstructions.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.6 Vehicle Painting

A permit may be required for vehicle painting using power spray operations at maintenance buildings. When required, such permits shall be acquired prior to initiation of painting operations. Painting with a brush or touch up painting with an aerosol can does not require a permit.

Reason for Policy: 10 CSR 10-6.020 (<http://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c10-6a.pdf>) , Air Pollution Control Program

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.7 Environment Site Assessment

All properties to be disposed of or purchased shall have an environmental review conducted prior to selling or purchasing. Environmental reviews are conducted for the benefit of the department to identify existing or potential environmental liability that may be present. Environmental reviews shall be conducted by the Environmental and Historic Preservation section of Design.

Reason for Policy: Reduce MoDOT liability.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.8 Salt Runoff

Measures shall be implemented that will eliminate damage to adjacent property from salt runoff generated from maintenance facilities. Salt and salt mix shall be stored under waterproof cover. For additional information see EPG 127.25.8.8.1 Storage.

Reason for Policy: RSMo 644 (<http://www.moga.mo.gov/mostatutes/chapters/chapText644.html>) Water Pollution, Federal Clean Water Act 33 U.S.C. §§ 1251 (<http://www.gpo.gov/fdsys/granule/USCODE-2011-title33/USCODE-2011-title33-chap26-subchap1-sec1251/content-detail.html>) -1387. There have been a number of incidents in which salt, salt brine, liquid calcium chloride runoff, or spillage from the storage of salt has caused environmental damage. Storm water runoff from salt piles, brine and calcium storage tanks and mixing areas has proven to be detrimental to aquatic life and vegetation.

Effective Date: 6/1/99

Revision Dates: 10/27/15

127.25.8.8.1 Storage

Chemicals and stockpiles of treated abrasives are to be stored in a manner to prevent loss of material and prevent damage to State or private property. All bulk salt shall be stored inside covered storage structures. Asphalt pads are to be constructed under and in front of all storage facilities. Mixed materials shall be covered when not in use and between storm events.

For additional information see EPG 127.25.8.8 Salt Runoff.

Reason for Policy: Prevent loss of material and drainage to private property. Most salt runoff damage comes from mixed piles.

Effective Date: 6/1/99

Revision Dates: 6/17/03, 10/27/15

Retrieved from "http://epg.modot.org/index.php?title=127.25_Maintenance_Environmental_Policies"

Category: 127 MoDOT and the Environment

- This page was last modified on 15 February 2017, at 11:59.

133.4 Snow and Ice Control Operations

From Engineering Policy Guide

Contents

- 1 133.4.1 Route Classifications
- 2 133.4.2 Mailboxes and Snow and Ice Control
- 3 133.4.3 Limits of Snow and Ice Control Work
- 4 133.4.4 Emergencies Off Right of Way
- 5 133.4.5 Safety Precautions during Snow and Ice Control
- 6 133.4.6 Statewide Winter Road Condition Report
- 7 133.4.7 Abandoned Vehicles
- 8 133.4.8 Winter Event Database



133.4.1 Route Classifications

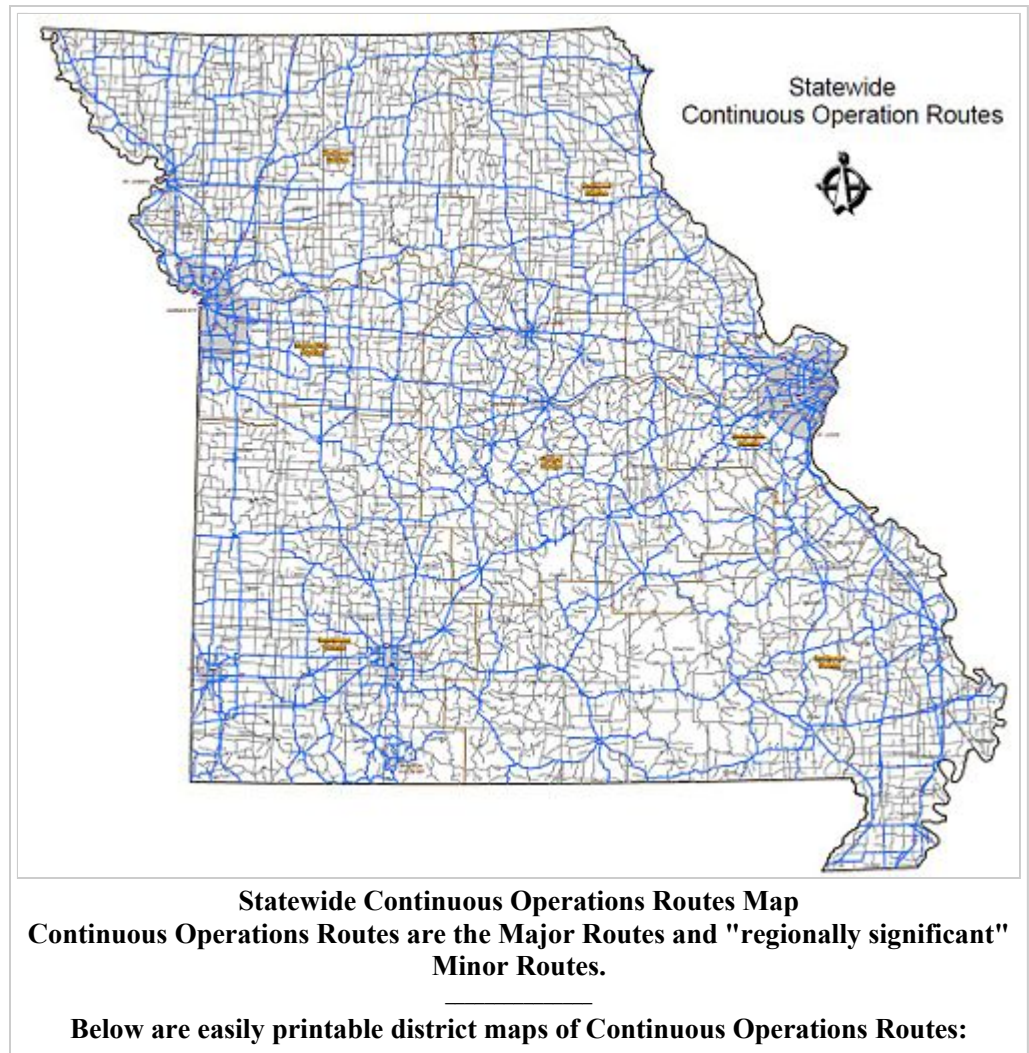
Continuous operations routes are given top priority. Continuous operations are the plowing and application of snow and ice control treatments on an as needed basis for a designated route, throughout the storm until all lanes are restored to a near normal condition. A district continuous operations system shall include all major highways, minor highways with traffic volumes of 2,500 AADT or greater and other urban and community routes designated by the district in consultation with the Maintenance Division. Continuity of route treatments as well as coordination with adjoining districts (regardless of AADT) shall be addressed between the districts. Snow and ice control shall follow these guidelines and objectives for determining route priorities, during winter events.

Continuous Operations Routes: These routes include all major highways, minor highways with 2,500 AADT or greater traffic volumes and other urban and community routes designated by the district in consultation with the Maintenance Division. This also includes all designated incident bypass routes.

The objective is to have all lanes on these routes restored to a near normal condition as soon as practical after the end of the storm. To achieve this objective, plowing and/or application of snow and ice control treatments on an as needed basis on these designated routes, 24 hours per day throughout the storm, will be necessary. Interstates and other higher AADT routes will be plowed and treated first. The use of anti-icing methods is appropriate for continuous operations routes.

Continuous Operations Route Paved Shoulders:

Removing snow and ice from major route paved shoulders should be performed in conjunction with plowing of the traveled lanes, especially the high sides of superelevated curves, if drifting is occurring, if weather predictions are unfavorable or to reduce ramping situations. The objective is to have paved shoulders for continuous operations routes plowed during, or shortly after, the storm. Do not treat paved shoulders directly with anti-icing or de-icing chemicals. It is acceptable for paved shoulders on continuous operations routes to remain covered or partially covered when snow and ice operations are suspended. It is not necessary to return paved shoulders to a near normal condition. Paved shoulders next to extended or continuous traffic barriers, bridge parapets, impact attenuators, guardrails, curbs, narrow medians and gore areas should be given special consideration where snow accumulates and has the potential to form ramps.



Northwest District
Kansas City District
Saint Louis District

Northeast District
Central District
Southwest District
Southeast District

Non-Continuous Operations Routes: All other state highways not included in the Continuous Operations Routes.

The objective is to have these routes open to two-way traffic and treated with salt and/or abrasives on hills, curves, intersections and other areas as needed. It is allowable for these routes to be plowed and the surface remain partly covered or covered when snow and ice operations are suspended. 24-hour per day coverage may be appropriate until the objective has been met. These routes should be prioritized by traffic volume. Reasonable efforts will be made to ensure that all roads have received some level of attention prior to morning and evening rush hours.

Plowing: Plowing operations should not begin until there is enough accumulation to warrant this effort. After the storm is over, plowing should cease once the loose accumulation is removed on minor routes and the continuous operations routes are in a near normal condition. On minor routes, plowing will begin as soon as snow equipment becomes available from higher priority routes.

Sight distance:

Sight distance

locations such as at intersections and

interchanges should be cleared of any obstructions caused by snow piles or accumulations.

Related Information

MoDOT Snow Academy Official Guide, Participant's Manual
(<http://wwwwi.intranet/hr/hred/documents/MoDOTSnowAcademyparticipantbook2009.pdf>)

Duration of Operations: Snow and ice removal operations shall remain in effect on a 24-hour per day basis until the above-mentioned objectives are met and sustained for both major and minor routes, so long as an acceptable level of progress can be achieved.

Post-storm clean up: Post-storm clean up during normal working hours includes continued plowing and treating of minor routes, bridge flushing and sweeping, equipment cleaning and maintenance, and salt storage housekeeping. The use of overtime for these activities is at the discretion of the district engineer.

Refer to Intent.

Reasons for policy: To ensure the routes with the most traffic are cleared first and provide uniform statewide snow removal practices.

Effective Date: 6/1/99

Revision Dates: 6/17/03, 10/14/05, 12/01/06, 8/16/07, 9/01/10

133.4.2 Mailboxes and Snow and Ice Control

MoDOT shall repair or replace, as required, those mailboxes and posts that have been damaged due to snow and ice removal operations. Replacement mailboxes shall comply with Post Office standards. Questionable situations should be referred to risk management.

Reasons for policy: To establish a procedure for dealing with these situations, ensure each situation is handled in the same manner and ensure continuous mail service.

Effective Date: 6/1/99

133.4.3 Limits of Snow and Ice Control Work

MoDOT does not assume responsibility for the removal or clearance of snow, ice or sleet, or the opening of windrows of such material, on any sidewalk or entrance along any state highway even though snow, ice or sleet, is deposited or windrowed on these sidewalks or entrances by department personnel. Maintenance and urban agreements with municipalities, in most cases, call only for the plowing of snow from the traveled portions of the street or roadway and there is no obligation to plow parking lanes or to remove the snow deposited from plowing the traveled way.

Reasons for policy: MoDOT's responsibility is snow removal from state highways in a timely manner and liability problems with use of equipment on private property

Effective Date: 6/1/99

133.4.4 Emergencies Off Right of Way

In the event of life threatening emergencies, MoDOT will respond to a request from an official or medical entity such as State Highway Patrol, police, sheriff, paramedical, ambulance service, doctor or fire department to open a non-MoDOT system road closed by snow. Other catastrophic events will require authorization by the district engineer.

Reason for policy: Establish procedures for off system snow removal work in emergency situations

Effective Date: 6/1/99

Revision Dates: 6/17/03

133.4.5 Safety Precautions during Snow and Ice Control

Lights - Lights and snow plow reflectors shall be checked repeatedly to ensure they are in good condition, operating properly and visible to all traffic. Operators shall clean all lights periodically during storms.

Stopping on Roadways - Equipment should not be stopped on the roadway surface to engage spreaders, or talk to another operator. Equipment should be pulled off the roadway to a safe spot to perform these tasks.

Slow Moving Equipment - Slow moving equipment shall stop occasionally at safe turn out locations to allow traffic to pass.

Flaggers and Signing - Flaggers and appropriate signing shall be used during post storm operations when shifting snow, cleaning bridge decks, loading snow or any operation which interferes with the normal flow of traffic.

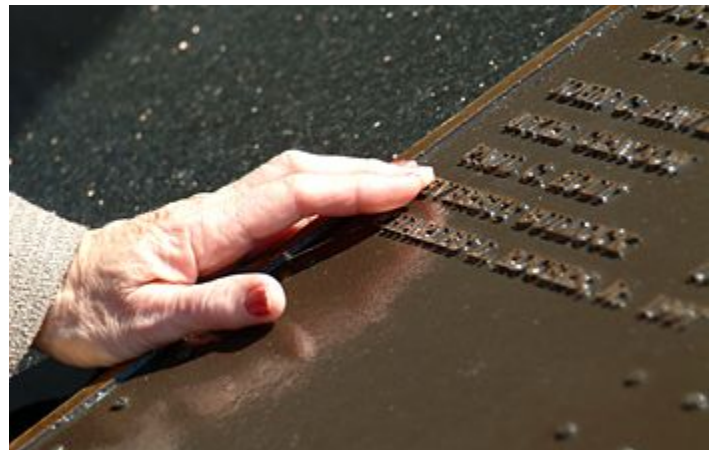
Bridges - Operators shall avoid pushing snow over bridge railings onto roads or railroads.

Railroad Crossings - Always raise the snow plow or grader blade to adequate clearance before crossing. Notify railroad authorities in case crossing cannot be cleared at once. Spreaders should be shut off through crossing

Reason for policy: Establish safety procedures for snow and ice removal operations

Effective Date: 6/1/99

Revision Dates: 6/17/03



133.4.6 Statewide Winter Road Condition Report

A statewide winter road condition report shall be made available to update the traveler information map on MoDOT's internet web site. Every year between November 1 and March 30, districts shall update the winter road condition report at the beginning of each workday, even if there is not a winter storm. Conditions will be reported as clear, mostly clear, partly covered, covered and closed. During winter weather, even if the storm falls outside of November 1 to March 30, districts shall report changes in road conditions as they occur, or at least every four hours throughout the winter event. Customers will rely on the information they find on the traveler information map, therefore we encourage districts to do updates more often on nights and weekends when roads are icy, snow covered or wet, and freezing may occur. After a storm ends, districts shall continue to report all changes in road conditions a minimum of every four hours until all continuous operations routes have returned to mostly clear conditions. The districts are still expected to update the Traveler Information Map when conditions change from mostly clear to clear, but they may wait until normal working hours to make this change. No overtime will be required to make this change. Districts that are unaffected by a winter storm only need to update information once per workday. The Traveler Information Map, that shows the winter road conditions to the public on the external web site, will show "Clear, Mostly Clear, Partly Covered, Covered and Closed".

Reason for policy: To ensure that the statewide report is correct and up to date, all districts must keep the reporting data current and accurate.

Effective Date: 6/1/99

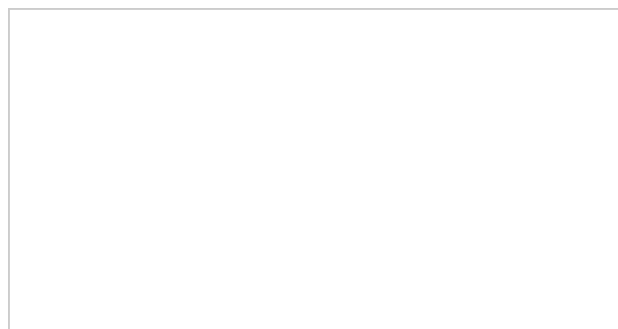
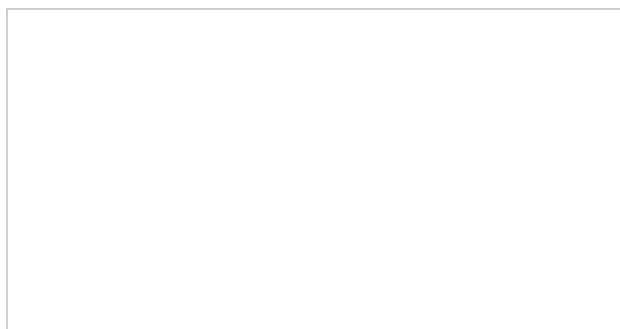
Revision Dates: 6/17/03, 8/16/07, 11/15/07, 9/01/10



Covered



Covered





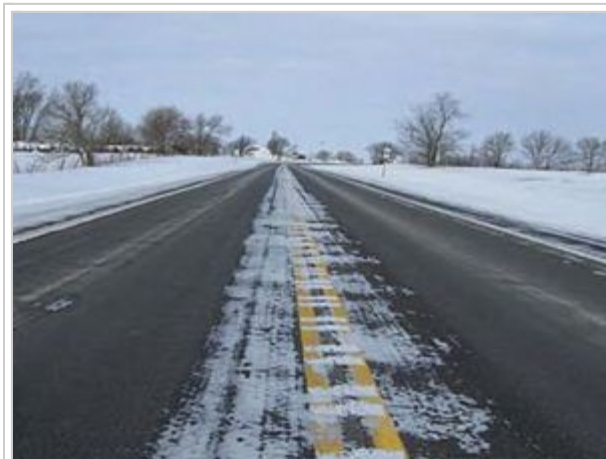
Partly Covered



Partly Covered



Near Normal/Mostly Clear



Near Normal/Mostly Clear



**Non-Continuous Operations Classification
Example - "Suspend Operations"**



**Non-Continuous Operations Classification
Example - "Suspend Operations"**

133.4.7 Abandoned Vehicles

During a snow and/or ice storm situation, MoDOT, with district office approval, may immediately remove any abandoned vehicle if it is creating a traffic hazard because of its position in relation to the state highway. Preferably the Missouri State Highway Patrol will take the lead roll in these situations.

Reasons for policy: RSMo 304.155 (<http://www.moga.mo.gov/mostatutes/stathtml/30400001551.HTML>)
Abandoned motor vehicles on public property, and RSMo 229.030
(<http://www.moga.mo.gov/mostatutes/stathtml/22900000301.html>) Roads cleared of obstructions

Effective Date: 6/1/99

133.4.8 Winter Event Database

A statewide Winter Event Report Database shall be made available for use by MoDOT Maintenance managers. This database shall be used to report and track information about winter events. Use this database to create a report whenever there are material and/or equipment usage charges related to falling precipitation events such as snow, sleet or freezing rain or non-precipitation events such as frost, black ice or refreeze of melted snow. This includes routine anti-icing efforts prior to an event or for frost control on bridge decks. No report is necessary if you do not have material and/or equipment usage charges.

Effective Date: 10/14/05

Retrieved from "http://epg.modot.org/index.php?title=133.4_Snow_and_Ice_Control_Operations"
Category: 133 Snow and Ice Control

- This page was last modified on 8 September 2015, at 13:12.

771.2 Bridge Cleaning and Flushing

From Engineering Policy Guide

Bridge cleaning and flushing is done to remove dirt and debris to allow proper drainage and drying of the deck. The dirt and debris holds moisture and chlorides that cause deterioration. Deck flushing should be done throughout the winter months when needed and temperatures safely permit. Thorough cleaning of entire bridge should be accomplished in the spring following snow season and again in the fall prior to snow season. This cleaning should include deck, piers, abutments, and lower chords of truss bridges.

Code: R329

Contents

- 1 Procedures
- 2 Safety
- 3 Guidance on Aquatic Invasive Species Control BMPs
- 4 Instructions

Procedures

1. Set up proper traffic control.
2. Remove all dirt and debris and ensure that all curb outlets and pipe drains are clean. Dispose of dirt and debris properly to prevent from entering Waters of the State.
3. Heavy buildup of dirt and debris may require removal prior to flushing. Sweeping or brooming is beneficial to supplement flushing. See EPG 127.25.1.4 Street Sweepings.
4. Adequate water supply and pressure is needed for effective flushing.
5. Spring and fall flushing should include all bridge items, drain system, drain basins, and under expansion devices.

Safety

Run off from flushing needs to be controlled to prevent property and environmental damage.

Guidance on Aquatic Invasive Species Control BMPs

Aquatic invasives such as zebra mussels and some algae species have infested several bodies of water in the United States and can be transported by vessels (barges, boats, tugs, tankers, etc.) and equipment that have been used in areas that contain these invasive species. If equipment is not properly inspected and treated to prevent the spread of invasives, these species can be introduced into areas not currently known to have a population. These invasive species are detrimental to existing ecosystems and can outcompete native species. To assist in preventing the introduction and spread of aquatic invasive species through MoDOT projects in Missouri streams and lakes, the following precautions shall be followed.

Contractors and MoDOT maintenance shall not take water for bridge deck flushing from Waters of the State (i.e., streams or lakes), unless they have implemented appropriate methods to prevent the possible spread of invasive aquatic species. Water sources from municipal water treatment plants or wells may be used without following these measures provided the water hauling equipment has not previously contained waters from streams or lakes. If the water hauling equipment has previously contained waters from other streams or lakes, the following measures must be implemented prior to use.

Prior to transporting temporary barges, tugs, boats, or other equipment used for work in Missouri streams or lakes, or re-using water hauling equipment following any use with water from Missouri streams or lakes, all equipment shall be washed and rinsed thoroughly with hard spray (power wash) or HOT (104° F) water, e.g. at a truck wash facility.

When possible, equipment shall be dried thoroughly, 5-7 days, in the hot sun before using in or transporting between Missouri streams and lakes.

If complete drying is not possible, one of the following treatment methods shall be utilized:

- Treat all interior and exterior surfaces with 140° F water for a minimum of 10 seconds contact on all surfaces.
- Submerge all surfaces in 100% vinegar for 20 minutes.
- Submerge in a solution of 200 ppm chlorine for 10 minutes.
- Treat all bilge water, and reservoirs holding water with a 10% bleach solution to kill any aquatic nuisance species.

All vinegar and chlorine runoff shall be contained and disposed of properly. See EPG 172.5 Wash Water for proper disposal procedures.

To avoid spreading invasive algae, check all gear and remove any visible algae, mud, and plants. Do not dispose of algae into bodies of water. Clean all gear and equipment with a solution of 2% bleach, 5% saltwater, or dish detergent. Allow all equipment to stay in contact with the solution for at least three minutes. Soak all soft items for at least 20 minutes. Dry all gear in the sun for at least 48 hours.

Prior to use of the aforementioned types of vessels, contractors shall provide the MoDOT inspector written documentation of its geographic origin (including the water body it was last used in), as well as defining the specified treatment method used to adequately ensure protection against invasive species.

Vessels and equipment shall be inspected upon removal from any body of water, cleaning hulls, anchors, moorings, trailers, etc., of all mud, vegetation, and any noticeable attached zebra mussels. This practice will assist in preventing the spread of invasive aquatic species between bodies of water. If zebra mussels are found upon inspection, immediate notification must be made to the MoDOT inspector (for contract jobs) and MoDOT Environmental (573-526-4778). A MoDOT Environmental Specialist will contact the Missouri Department of Conservation Aquatic Habitat Specialist (417-326-5189, ext. 1844).

Instructions



Set up proper traffic control. Remove all dirt and debris and ensure that all curb outlets and pipe drains are clean. Heavy buildup of dirt and debris may require removal prior to flushing. Sweeping or brooming is beneficial to supplement flushing.



Adequate water supply and pressure is needed for effective flushing.



Spring and fall flushing should include all bridge items, drains system, drain basins, and under expansion devices.

Retrieved from "http://epg.modot.mo.gov/index.php?title=771.2_Bridge_Cleaning_and_Flushing"

Category: 771 Bridge Preventive Maintenance Guidelines

- This page was last modified on 22 November 2016, at 10:58.

806.8 Storm Water Pollution Prevention Plan (SWPPP)

From Engineering Policy Guide

Contents

- 1 806.8.1 Introduction to the Storm Water Permit and Storm Water Pollution Prevention Plan (SWPPP)
- 2 806.8.2 Site Description and Project-Specific Information
- 3 806.8.3 Developing/Amending Project-Specific Project Plans
 - 3.1 806.8.3.1 Shoulder Addition Project Plan Development and Implementation
- 4 806.8.4 Site Inspections and Reports
- 5 806.8.5 Drainage Areas and Housekeeping
- 6 806.8.6 Erosion and Sediment Control (MO Specifications Division 800)
 - 6.1 806.8.6.1 Construction Requirements
 - 6.2 806.8.6.2 Non-Structural Control Measures
 - 6.3 806.8.6.3 Erosion Control Measures
 - 6.3.1 806.8.6.3.1 Soil Surface Roughening
 - 6.3.2 806.8.6.3.2 Mulching and Crimping
 - 6.3.3 806.8.6.3.3 Temporary Berms - Erosion Control
 - 6.3.4 806.8.6.3.4 Temporary Pipe Slope Drains
 - 6.3.5 806.8.6.3.5 Interception Ditches and Letdown Structures (Including Roadside & Median Ditches)
 - 6.3.6 806.8.6.3.6 Temporary Pipes and Temporary Construction Crossings
 - 6.3.7 806.8.6.3.7 Energy Dissipaters
 - 6.3.8 806.8.6.3.8 Seeding and Mulching
 - 6.3.8.1 806.8.6.3.8.1 Temporary Seeding and Mulching (MO Specifications Sec 802 and Sec 805)
 - 6.3.8.2 806.8.6.3.8.2 Permanent Seeding and Mulching (MO Specifications Sec 805)
 - 6.3.9 806.8.6.3.9 Fiber Reinforced Matrix (FRM)
 - 6.3.10 806.8.6.3.10 Erosion Control Blankets and Turf Reinforcement Mats
 - 6.4 806.8.6.4 Sediment Control Measures
 - 6.4.1 806.8.6.4.1 Sediment Basin
 - 6.4.2 806.8.6.4.2 Sediment Trap
 - 6.4.3 806.8.6.4.3 Ditch Checks
 - 6.4.4 806.8.6.4.4 Silt Fence (MO Specifications Sec 624 and 1011)
 - 6.4.5 806.8.6.4.5 Rock/Mesh Sediment Control Fence and Inlet Protection Device
 - 6.4.6 806.8.6.4.6 Inlet Controls
 - 6.4.7 806.8.6.4.7 Temporary Berms — Sediment Control
 - 6.4.8 806.8.6.4.8 Compost Filter Devices
 - 6.4.9 806.8.6.4.9 Mulch Berms
 - 6.4.10 806.8.6.4.10 Brush Pile Checks/Barriers
 - 6.4.11 806.8.6.4.11 Straw Bales (MO Specifications Sec 802)
- 7 806.8.7 Disturbed Areas
- 8 806.8.8 Installation and Removal
- 9 806.8.9 Dewatering
- 10 806.8.10 Roadways
- 11 806.8.11 Diamond Grinding and Other Surface Treatments

- 12 806.8.12 Concrete Washout
- 13 806.8.13 Turbidity Reduction and Advanced Treatment Systems

806.8.1 Introduction to the Storm Water Permit and Storm Water Pollution Prevention Plan (SWPPP)

Easily Printable Version of SWPPP

ry latest SWPPP information, but this docx file may be helpful for those wanting to easily print the SWPPP

SWPPP in revision mode so that the reader can view the changes made to the January 2014 version of the SWPPP.

Forms and Figures

responsibility

PPP Information

1.2

/Sediment Control Site Plans

nspection Record

iment Control Site Plans

urbance Inspection Record (<http://ghepg01/forms/CO/Land%20Disturbance%20Inspection%20Record%20->

/PPP Evaluation Form

rbidity Tube Testing Procedures

lose Out Procedures Checklist

/EPGResponse/Attachments/527/SW%20Database%20Entry%20and%20Closeout%20Procedures%20Checklist.pdf)

construction Conference Form

Additional Information

Land Disturbance Training 2014, a summarized refresher presentation

Provisions of the federal Clean Water Act and related state rules and regulations require stormwater permits where construction activities disturb one acre or more over the life of a project as part of a common plan or sale. MoDOT has a general State Operating Permit (<http://dnr.mo.gov/env/wpp/permits/pn/>) , obtained from the Missouri Department of Natural Resources (DNR) (<http://www.dnr.mo.gov/>) , that allows for land disturbance activities associated with highway, bridge and compensatory mitigation construction as well as maintenance activities related to the upkeep of these features. The permit stipulates that MoDOT will develop a project stormwater pollution prevention plan (SWPPP) describing erosion and sediment control guidelines and install temporary and permanent erosion and sediment control measures.



Locally sponsored federal aid projects involving an acre or more of land disturbance will need to obtain their own permits and develop effective SWPPPs. In some instances cities, counties and other government entities may already possess their own State Operating Permit and, in that case, must comply with their own SWPPP.

There are instances where contractors may have to obtain their own permits for work involving borrow and excess (waste) disposal areas, and in some instances when portable plants are used. (See Fig. 806.8.1 MoDOT/Contractor Responsibility for details about the permitting requirements of these scenarios.) Also, in a few rare cases, MoDOT may require contractors to obtain their own individual State Operating Permit for land disturbance activities even though the project is being constructed on MoDOT right of way. These unique situations will normally be design/build projects that are funded by MoDOT, but totally managed by the contractor.

The purpose of the SWPPP is to ensure the design, implementation, management and maintenance of Best Management Practices (BMPs) in order to reduce the amount of sediment and other pollutants in storm water discharges associated with the land disturbance activities; comply with the Missouri Water Quality Standards (http://www.dnr.mo.gov/env/wpp/wqstandards/wq_criteria.htm) , and ensure compliance with the terms and conditions of the general permit.

The following documents were used in the preparation of this SWPPP:

- **Best Management Practices for Erosion and Sediment Control**, (Report No. FHWA-FLP-94-005) published by the United States Department of Transportation (1995)
- **Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices**, (Document number EPA 832-R-92-005) published by the United States Environmental Protection Agency (1992)
- **Protecting Water Quality: A field guide to erosion, sediment and storm water best management practices for development sites in Missouri**
- **Missouri Standard Specifications for Highway Construction** (http://www.modot.mo.gov/business/standards_and_specs/highwayspecs.htm)
- **Missouri Department of Transportation Engineering Policy Guide**
- **Menu of BMPs – United States Environmental Protection Agency** (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=4) .

A typical MoDOT project involves the implementation of many documents, processes and standard operating procedures. These various processes and procedures are of such detail that it is impossible to include in this brief summary of BMPs. Pollution from storm water can be reduced by the implementation of the BMPs, construction techniques and site management measures in this article. However, pollution from storm water will also be reduced by the issuance of change orders, letters/memos of notification, Order Records and Contractor Performance Reports. Changes that occur as a result of directives to contractors will usually be documented by Document Records and other various product and reports produced by the computer program, SiteManager (<http://wwwi.intranet/cm/siteManager.htm>) . Lastly, a Semi-Final Inspection Report can serve to identify post-construction measures that will ensure permit compliance and water quality protection.

In addition to these contract management tools, MoDOT conducts annual storm water permit compliance training for construction site inspectors, resident engineers, designers and other personnel including contractors and consultants. The information distributed in that class goes beyond the scope of this statewide SWPPP document. Many effective BMPs and construction techniques are discussed during that training, but may not yet appear in this article.

These and other unique MoDOT tools must be considered elements of a SWPPP because they all result in implementation of measures that cause or caused a resultant action to occur on a construction project.

806.8.2 Site Description and Project-Specific Information

Example Project-Specific SWPPP Information Form, outlines project-specific information that is required to be completed for all MoDOT projects involving land disturbance of one acre or more. Also required, and denoted at the bottom of Form 806.8.2, is the development of a project overview map, or maps, depicting the project location/alignment with enough detail to show waters of the United States within 1 mile of the project. These named waters of the U.S. are typically illustrated on U.S.G.S. topographic maps, and some county or city maps, as blue line streams or named impoundments, such as lakes and reservoirs, as well as tributaries to these bodies of water. Along with this information, MoDOT develops project-specific erosion and sediment control plan sheets (site maps) based on first-hand knowledge of site conditions and guidance described within this narrative SWPPP. Development of project-specific erosion and sediment control plans is described in EPG 806.8.3 Developing/Amending Project-Specific Project Plans.

806.8.3 Developing/Amending Project-Specific Project Plans

EPG 237.1 Plan Details describes the information that is to be included in all plans used by contractors to construct MoDOT projects. All projects are constructed from a set of project-specific design plans that are generated by MoDOT designers or consultants. The plans show all existing topographic features, buildings, roadways and drainages, as well as right of way limits. Within a project's design plans are erosion and sediment control plans which serve as the site maps for projects involving one acre or more of land disturbance. These site maps are to be used in combination with this narrative SWPPP to manage erosion and sediment control on MoDOT projects. These plans contain sufficient information to be of practical use to contractors and site construction workers to guide the installation of BMPs in the beginning, interim and final stages of construction. Up-to-date site maps are to be on location or electronically accessible at active MoDOT job sites when MoDOT's construction inspector or the contractor superintendent is on site. In lieu of paper copies, site maps can be maintained in digital format and accessed by electronic devices.

Though erosion and sediment control plans are developed by MoDOT designers and/or consultants, it is highly recommended that design and construction personnel work collaboratively to develop a strategy to control erosion, sediment and stormwater for applicable projects. There should generally be two sets of erosion and sediment control plans developed for projects with one acre or more of land disturbance. One set should be developed to depict existing site topography with outfall and perimeter protection BMPs, such as sediment basins, sediment traps, Type C berms, silt fence, etc., that will need to be installed prior to starting land disturbance of the site. The second set will generally show final project grade and BMPs that are envisioned during project construction and upon completion of final grading. The location of designed BMPs will be illustrated on the plan sheets; however, the exact location of BMPs will be determined in the field by the engineer or inspector.

Contract plans shall include erosion and sediment control measures that are sufficient to protect rivers, streams, lakes, ponds, wetlands and private land adjacent to MoDOT right of way.

MoDOT site maps (erosion and sediment control plans) are to include:

- Direction(s) of stormwater flow and approximate slopes anticipated after grading activities
- Areas of soil disturbance and areas that will not be disturbed
- Location of major structural and non-structural BMPs
- Locations where stabilization practices are expected to occur
- Locations of on and/or off-site material, waste, borrow or equipment storage areas
- Locations of all waters of the U.S.
- Locations where stormwater discharges to a surface water
- Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

Due to project phasing, all erosion and sediment control BMPs shown on project plans will not be installed until needed, based on site conditions. Therefore, for protection against regulatory scrutiny, designers or inspectors should note on erosion and sediment control sheets that all devices will be installed as necessary based on the discretion of project personnel. Inspectors can also create a clean set of plans, with no BMPs depicted, as the working copy for SWPPP purposes and add/remove only installed devices. A legend should be created for installation and removal of BMPs. BMPs should be highlighted and dated as they are installed or removed. It is important that site maps reflect BMPs that are actually on the ground at any given time, so plan sheets shall be properly updated each time BMP additions and/or removals take place on the project. Example erosion and sediment control site plans can be found in Fig. 806.8.3, Examples of Erosion/Sediment Control Site Plans.

The engineer shall require modifications to the erosion and sediment controls whenever the:

- Design of the construction project has changed in a fashion that could impact the quality of stormwater discharges;
- MoDOT inspections indicate deficiencies in individual BMPs;
- MDNR/EPA notifies MoDOT of erosion and sediment control deficiencies on site;
- Erosion and sediment controls are determined to be ineffective in significantly minimizing or controlling erosion and sedimentation;
- MDNR determines violations of Water Quality Standards have occurred.

806.8.3.1 Shoulder Addition Project Plan Development and Implementation

Shoulder addition projects involving land disturbance of an acre or more can be particularly challenging to design, bid and implement BMPs. Design and construction personnel should collaborate to establish typical, desired BMP layouts for outfall and perimeter protection. These layouts should then be illustrated on a “Typical” erosion and sediment control plan as detailed plan sheets are not usually developed for these projects (There are a few exceptions to this when right of way acquisition or extensive grading is required). Designers will then estimate a quantity of BMPs necessary to construct the project. The estimated quantity of each type of BMP can be expressed in a table on the quantity sheet to be included in the contract plans for contractors.

In addition, like other land disturbance projects of an acre or more, shoulder addition projects are required by permit to have a site map depicting the location of all installed BMPs. If a full set of plan sheets is not developed, an acceptable practice for shoulder addition project site maps is to develop aerial photography sheets of the project corridor at a scale of 1” = 200’, labeling named bodies of water, intersecting routes and county roads, and labeling log miles every 0.5 mile for the project (depicting tick marks every 0.1 mile is recommended for better accuracy). If full survey data was collected for the project, the log mile stationing may be set up precise based on survey data. Full surveys are not typical for shoulder addition projects, so a “rough” log mile stationing may be set up for the simple purpose of identifying approximate BMP locations to enhance communication, illustration and documentation for inspectors and contractors. The aerial sheets will not be included as part of the contract documents, but will be given directly to the Resident Engineer along with other supplemental project documents.

It is important to be aware that all designed BMP quantities may have to be adjusted depending on the contractor’s selected method of shoulder construction. Any expected adjustment in BMP quantities or implementation should be expressed to the prime and subcontractor, if applicable, during the erosion and sediment control discussion at the project preconstruction conference.

806.8.4 Site Inspections and Reports

The resident engineer (

routinely inspect the installation, condition and functionality of erosion and sediment controls. If allowable due to right-of-way constraints, receiving streams shall be inspected for off-site sediment deposits for 50 ft. downstream of project outfalls. Routine inspections are to be conducted at a minimum frequency of once every 7 calendar days. Additional, post-runoff inspections must occur within 48 hours if the runoff event ceases during a normal work day and within 72 hours, on the next business day, if the runoff event ceases during a non-work day such as weekends or state recognized holidays. A runoff event is defined as an event that causes runoff to occur on the job site and could result from rainfall or snow or ice melt. If there are consecutive days of measurable rainfall and/or runoff, these can be considered one event and precipitation totals should be tracked on a daily basis and an event total recorded. Since these consecutive days are considered to be one event, a post-runoff inspection should be done after the rain/runoff ceases; however, general observations should be made daily, especially with regard to outfall BMPs, to ensure BMPs are performing to the desired level. If rainfall or snow/ice melt is not sufficient to cause runoff, inspection reports do not need to be completed until the next required 7-day inspection.

Form 806.8.4, Land Disturbance Inspection Record, will be used for weekly and post-runoff inspections. This form has been developed as a guide to assist the inspector with permit compliance, while also requiring a general narrative description of current site conditions observed by the inspector at the time of inspection. The inspection reports shall be signed by the inspector and the engineer. The engineer or inspector will keep a log of all inspections made on the project.

The engineer or inspector will ensure that rainfall measurements are made for the job site and routinely monitor weather forecasts to recognize when predicted weather may threaten the construction site and when runoff has occurred. If the weather forecasts indicate storms may impact the project site, project personnel should evaluate whether or not the site has adequate BMP protection and is prepared to receive runoff and sediment.

Areas of the project that meet the final stabilization requirements (i.e., 70% permanent vegetative cover over 100% of the area, rock covered, paved, etc.) no longer require inspection, but casual observations should be made to ensure erosion problems don't arise.

The engineer or inspector shall notify the contractor within 24 hours if any controls are found to be improperly installed, in disrepair, or are not functioning at the desired level of effectiveness. **Any deficiencies noted shall be corrected within 7 calendar days;** however, the engineer and inspectors may require immediate attention and issue various directives by other means discussed in EPG 806.8.1 Introduction to the Stormwater Permit and SWPPP. Directives to the contractor shall be noted in project records, which shall be available for review by DNR upon request. **In instances where weather conditions make it impossible to correct deficiencies within 7 days, the engineer or inspector will document site conditions in the inspection reports. This documentation will include a written description and pictures illustrating the adverse conditions. Brief documentation of adverse conditions should take place daily until conditions improve. As soon as weather and site conditions become favorable, corrections to deficient BMPs shall be made.**

MoDOT performs environmental compliance training for construction site inspectors, resident engineers, designers and other personnel, including contractors and consultants, to ensure that erosion and sediment control inspections are being conducted in a consistent fashion statewide. The individual who performs the training is organizationally located in MoDOT's Environmental and Historic Preservation Section and does not have supervisory authority over the construction personnel who perform inspections. However, the same individual who performs training has the responsibility of performing statewide audits of construction sites to ensure that SWPPPs are being followed to the extent that off-site contamination does not occur. This individual will usually visit every construction site involving an acre or more of land disturbance at least once per year and meet with MoDOT resident engineers, inspectors and contractors to evaluate the land disturbance elements of the project and to ensure consistency of inspections. In cases where deficiencies are identified, the resident engineer or inspector has the responsibility to see that the deficiencies are corrected.

As part of the project inspection and compliance management process, the project's current authorized, open-erodible and disturbed acreage totals shall be recorded in Sitemanager when contractor pay estimates are run. These acreage totals are used to fulfill MoDOT's permit requirement to provide a list of statewide active land disturbance sites, one acre or more, to MDNR on a quarterly basis, every January, April, July and October. Also included within each report is the project name, location, description, primary receiving water(s), number of acres disturbed, percent completion and projected date of completion.

Primary receiving waters are named rivers, streams, lakes, etc. (e.g., Black River, Skull Lick Creek, Flat Branch, Longview Lake). If the project doesn't drain directly to named bodies of water, the inspector should list "Unnamed Tributary to" and then the named body (bodies) of water the project runoff would eventually end up within. Some urban projects will discharge to city stormwater systems. In this case, if the body of water the storm drain discharges to is unknown, simply list "Municipal Storm Sewers" and identify the entity if possible (e.g., MSD Municipal Storm Sewers).

(Note: There are scenarios associated with the use of borrow and excess (waste) disposal areas, as well as portable plants, when the contractor may be responsible for site inspections. Please refer to Fig. 806.8.1, MoDOT/Contractor Responsibility, for inspection responsibilities in these scenarios.)'

806.8.5 Drainage Areas and Housekeeping

In compliance with the Missouri Clean Water Law (Section 644.051 (<http://moga.mo.gov/statutes/C600-699/6440000051.HTM>)), neither MoDOT nor MoDOT's contractors shall pollute any waters of the state, or place, cause, or permit to be placed any water contaminant in a location where it is reasonably certain to cause pollution of any waters of the state. To comply with this law, proper preventive measures and good housekeeping shall be maintained on job sites. Job site litter, construction debris and sanitary waste should be controlled. All litter shall be placed in appropriate containment receptacles. The use of portable toilets may be necessary to control sanitary waste in some situations. If used, these facilities shall be adequately placed and maintained so as not to cause a safety or environmental concern. If hazardous waste is generated or encountered on a job site, the MoDOT Environmental Section, (573) 526-4778, should be informed immediately to assure proper handling and compliance with environmental regulations. Also, neither MoDOT nor MoDOT's contractors shall discharge water contaminants into any waters of the state, which reduce the quality of these waters below the state's water quality standards. These water quality standards include the following (MO 10 CSR 20-7 (<http://sos.mo.gov/adrules/csr/current/10csr/10c20-7a.pdf>))):

- (a)** Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
- (b)** Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.
- (c)** Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
- (d)** Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.
- (e)** Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.
- (f)** Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, Section 260.200, RSMo

(<http://moga.mo.gov/STATUTES/C260.HTM>) , except as the use of such materials is specifically permitted pursuant to Section 260.200–260.247.

MoDOT personnel or contractors hired by MoDOT shall comply with these and any other federal, state, and local laws and regulations controlling pollution of the environment. To ensure that these general criteria are met, the following guidelines will be observed:

- 1) Machinery shall be kept out of the waterway as much as possible.
- 2) Fuel, lubricants, debris and other water contaminants shall not be stored in areas that are subject to contact with water (such as adjacent to stream banks) or where contaminated runoff from the storage areas can enter waters.
- 3) Refueling and maintenance (e.g., oil changing) of machinery shall not take place in, or directly alongside, any water body.
- 4) Clearing of vegetation/trees shall be kept to the minimum required to accomplish the activity.
- 5) Riparian areas and banks shall be restored to a stable condition through recontouring and revegetation of the area, as necessary, as soon as possible (normally within three working days of final contouring).
- 6) Work shall be conducted during low flow whenever possible.
- 7) Wetland areas shall be avoided to the extent practical.
- 8) Work shall conform to all conditions that are part of the USACOE Section 404 permit and the ancillary MDNR Section 401 Water Quality Certification.

EPG 127.19 Section 404 Clean Water Act for Bridge Demolitions provides a detailed explanation of the process that is followed whenever a stream or drainage channel may fall into USACOE jurisdiction.

806.8.6 Erosion and Sediment Control (MO Specifications Division 800) **(http://www.modot.mo.gov/business/standards_and_specs/DIV0800.pdf)**

Water pollution control measures shall be required of all contractors MoDOT hires. The contractor shall exercise best management practices throughout the project to control water pollution. Construction of permanent drainage facilities and other activities, which may contribute to the control of siltation, shall be accomplished at the earliest practicable time. This work shall also consist of furnishing, installing, maintaining, and removing temporary control measures as shown on the plans (see Standard Plan 806.10

(http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf)) or as directed by the engineer. The control of water pollution will be accomplished through the use of berms, slope drains, ditch checks, sediment basins, seeding and mulching, straw bales, silt fences and other erosion and sediment control devices or methods. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage or other harmful materials shall not be discharged from the project. No work shall be started until the erosion and sediment control timetable and methods of operation have been approved.

Temporary erosion control measures shall be coordinated with permanent erosion control measures to assure economical, effective and continuous erosion and sediment control. Temporary erosion controls must be kept in place, inspected and maintained until revegetation, rock blanketing, paving, or another form of stabilization has occurred to an extent sufficient to minimize sediment loss from the project and comply with MoDOT's State Operating Permit.

Materials required for erosion and sediment control measures shall meet the standards of the *Missouri Standard Specifications for Highway Construction*.

806.8.6.1 Construction Requirements

The goal for MoDOT land disturbance operations is to deliver the planned final product (e.g., roadway, bridge, etc.) while ensuring effective erosion, sediment and stormwater management throughout the design, construction and maintenance process to minimize sediment loss from the project.

Permanent erosion control measures (e.g., permanent vegetation) shall be implemented into the project at the earliest practicable time in order to control erosion, reduce sediment control maintenance and improve the overall appearance of the project. Temporary erosion and sediment control measures shall be used to correct conditions that develop during construction which were not foreseen during the design stage. Temporary controls shall also be used when needed prior to installation of permanent erosion control measures or to control erosion that develops during normal construction practices.

When practical, clearing and grubbing operations shall be scheduled and performed so that border, perimeter, or outfall BMPs to control runoff from disturbed areas will be installed or marked for preservation before general site clearing. A limited amount of clearing (enough to gain access to the area) may be permissible to enable the installation of outfall and perimeter controls. Stormwater discharges from disturbed areas, which leave the site, shall pass through an appropriate impediment (BMP) prior to leaving the site. The surface area of erodible earth material exposed at one time by clearing and grubbing, by excavating, by fill, or by borrow, shall be minimized to limit vulnerability of erosion and potential sediment loss from the project. The engineer may limit the total acreage of erodible earth material to be exposed at one time as determined by an analysis of project conditions. In such cases the engineer will identify specific BMPs and controls that have been, or will be installed in order to exceed the specified maximum disturbed acreage threshold.

The engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress commensurate with the contractor's ability to keep the finish grading, mulching, seeding, and other erosion control measures current. Should seasonal limitations make such coordination unrealistic, temporary erosion and sediment control measures shall be implemented as directed by the engineer.

Unless otherwise approved, construction operations in rivers, streams, wetlands, and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures. Rivers, streams, wetlands, and impoundments shall be promptly cleared of all falsework, piling, debris or other obstructions placed therein or caused by the construction operations.

Frequent fording of live streams or wetlands with construction equipment is not permitted. Temporary bridges or other structures shall be used wherever stream crossings are necessary. All temporary fills and structures placed in streams, wetlands, or impoundments will be removed and the site returned to natural or intended contours prior to completion of construction. Unless otherwise approved, mechanized equipment shall not be operated in live streams except as may be required to construct channel changes and temporary or permanent structures. If a Section 404 permit is applicable for a project, its requirements and/or conditions shall be followed.

Site-specific BMPs above and beyond those identified within the contract plans or MoDOT standard specifications shall be discussed with the contractor at a preconstruction conference, if known, or as necessary to control erosion and minimize sediment loss throughout the life of the project. The use of alternate BMPs or methods may be acceptable, but approval of alternate practices will need to be approved by the engineer. Also, special conditions may be developed which can include limitations on the amount of surface area that can remain unprotected at one time or could include special water quality or stream protections requirements.

The location of all local material pits (other than commercially operated sources) and all excess material areas shall be subject to the approval of the engineer (material in this case refers to soil and rock). Construction operations shall be conducted and pollution control measures implemented so that erosion will not result in water pollution.

Portable concrete and asphalt plants located on MoDOT right of way can be covered under the MoDOT State Operating Permit. Any discharges from these operations must be managed by appropriate BMPs. The plant and BMPs must be depicted on the project site map and appropriately accounted for in the project SWPPP. Operators of portable plants that are located off of MoDOT right of way will be responsible for obtaining all appropriate permits directly from the DNR. The contractor is responsible for all costs associated with erosion and sediment control to protect plant locations, regardless if the plant is located on or off of MoDOT right of way or easements.

Borrow and excess (waste) disposal sites located on MoDOT right of way or owned by MoDOT can be covered by the MoDOT permit and SWPPP. For borrow and excess disposal activities not located on MoDOT right of way, the borrow or excess disposal operator will be responsible for obtaining all appropriate permits, including a land disturbance permit directly from the DNR for sites greater than or equal to one acre.

In the event of a conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations may apply.

806.8.6.2 Non-Structural Control Measures

Protection of existing vegetation is an important and sometimes overlooked component of erosion and sediment control. Preserving natural vegetation in certain areas during construction serves to slow the flow of water, protect against erosion and reduce sediment transport from sheet flow. Vegetated filter strips (i.e., buffers) located along the shoulder, within the median, in MoDOT ditches, or adjacent to a body of water or wetland, serve as excellent sediment capture devices. They can be particularly effective in areas where the density of grass and other herbaceous vegetation can filter the water. In most cases, vegetative buffers are used in concert with other BMPs; however, there may be situations where vegetative filter strips can suffice as independent features. Depending on site characteristics, these areas of undisturbed right-of-way can potentially provide the same benefit to water quality as would many types of structural controls, such as silt fences, ditch checks, and sediment traps or basins. If natural or created vegetated filter strips are used, they must be located within MoDOT right of way or easement and inspected and maintained like other BMPs. Vegetation on an adjacent property cannot be used as a MoDOT BMP. During project design, site conditions and stormwater runoff analysis will determine the selection of appropriate BMPs, which may include non-structural BMPs and vegetated buffers. If during inspections, BMPs, including vegetated buffers, are determined to be ineffective or insufficient at controlling erosion or sediment transport, additional BMPs will need to be installed to effectively manage the stormwater runoff.

Preserving natural vegetative filter strips is especially important when working in proximity to surface waters, which may include, but are not limited to, rivers, streams, lakes, ponds and wetlands. When working along or adjacent to these features, MoDOT is required by its statewide land disturbance permit with MDNR to retain a minimum of a 25-foot buffer of undisturbed natural vegetation between land disturbance operations and the body of water, unless site conditions and/or limitations make the use of such a buffer infeasible. To comply with this permit requirement, when working adjacent to these waters, MoDOT should determine on a case by case basis whether preserving an existing buffer is feasible, or whether contractor or maintenance operations will require complete use of the area to facilitate work activities. Preserving natural vegetative buffers must be considered for all MoDOT projects working in proximity to surface waters; however, factors like limited right-of-way, contractor/maintenance access, and the nature of work activity (e.g., bridge and culvert installation, maintenance and repairs) are often going to make MoDOT's use of this BMP infeasible. In these cases contractor/maintenance activities would make use of most or all areas of right-of-way or easement, which could include work up to the edge of, or even within waters of the state. If a vegetative buffer can be preserved, it must be incorporated as a non-structural BMP and denoted on plan sheets to remain undisturbed. If use of a buffer is determined to be

infeasible or not effective at managing stormwater runoff, as previously mentioned, MoDOT will install other appropriate alternative BMPs to minimize sediment loss from the project. The choice of an alternative BMP, or combination of BMPs, will depend on site variables, but could include the use of Type C Berms, sediment basins, sediment traps, ditch checks, perimeter silt fence (including mulch berms) and the effective use of temporary or permanent seed and mulch or erosion control blankets, all described within this SWPPP, to limit erosion and any subsequent sediment transport. All BMPs, including any vegetated filter strip(s), will need to be identified, inspected and managed within the project SWPPP.

Like other BMPs, vegetated buffers should be inspected for effectiveness and maintained accordingly. Sediment deposits within vegetated buffers may be left in place or removed post construction depending on MoDOT's future plans for the area and consideration of whether there is a potential to affect water quality in adjacent surface waters. Inspectors should also consider whether it would be more destructive to the buffer to retrieve sediment deposits than to leave them. If leaving sediment deposits within vegetated buffers, it may sometimes be necessary to seed and mulch over the area, depending on the amount of sediment deposited.

Other Non-Structural BMPs such as seeding, mulching, stabilized construction entrances, flocculants and other chemical additives are discussed elsewhere in this document.

806.8.6.3 Erosion Control Measures

The emphasis on MoDOT projects should be on erosion control, focusing on covering up exposed soil, preferably with permanent vegetation, rock, pavement, etc., as soon as practical in order to protect the soil surface and keep soil particles from dislodging and entering stormwater. Focusing on controlling stormwater velocity and volume is also an important consideration. Best management practices (BMPs) shall be used by contractors to minimize sediment loss from MoDOT right of way onto adjacent land or into streams, lakes, ponds, wetlands, drainage channels, etc..

The following described practices are commonly used erosion control BMPs that may be used individually or in combination with other practices, such as the sediment control devices discussed in EPG 806.8.6.4 Sediment Control Measures, to assure effective erosion control and minimize off site delivery of pollutants. Other practices that are not listed here, or have not been identified or invented at the time of the preparation of this SWPPP, may be used if their performance is equivalent or better than the practices listed below.

806.8.6.3.1 Soil Surface Roughening

Surface roughening is a temporary erosion control BMP that will reduce runoff velocity and erosion potential by increasing infiltration and sediment trapping. This practice is intended for areas which have been cleared and grubbed and are awaiting application of temporary or permanent seed, or installation of other structural controls such as ditch checks, sediment traps, or sediment basins. The practice is NOT intended to serve as a stand-alone best management practice and is only to be used as a short-term, sequential practice as the grading and seeding proceeds.

Where backslopes are unlikely to be mowed or maintained due to steepness and lack of access, surface roughening can be a permanent measure. In these situations seed and mulch may be applied directly to the roughened seed bed. This will aid in the establishment of vegetative cover and will minimize destructive compaction by heavy equipment. There are three common methods of surface roughening (tracking, grooving, stair stepping) that can be employed depending on the soil type, slope and potential maintenance concerns for the project.

A. Tracking involves the use of tracked construction equipment (dozer, high lift, etc.) vertically tracking up and down slopes in order to create horizontal depressions, perpendicular to the runoff path, on the soil surface. These depressions reduce stormwater velocity and the potential for concentrated runoff, which typically leads to rill formation. Tracking can lead to significant soil compaction, which does help lock soil

particles in place; however, it is also undesirable for root production and grass growth. Due to this fact, care should be taken in deciding which slopes to track. Tracking is typically recommended for sandy soils, where risk of excessive compaction is reduced.

B. Grooving involves the creation of a series of ridges and depressions that run along the contour of a slope. The grooves can be created using a variety of implements such as a disks, harrows, chisel plows, loader teeth, etc. The grooves should be no more than 3 inches deep and no more than 15 in. apart.

C. Stair-stepping involves creating stair steps to reduce runoff velocity and encourage sedimentation on steeper slopes that will not be mowed. The stairs should be cut such that the vertical step does not exceed 1 foot. The horizontal step should be longer than the vertical step and sloped inward toward the vertical step face to promote sedimentation.

806.8.6.3.2 Mulching and Crimping

Application of mulch without seed may be used as a temporary best management practice if approved by the engineer. This temporary stabilization practice is most applicable in late fall or early winter when grass seed would have little or no opportunity to germinate. Straw mulch should be applied with a mulch blower, or by hand, and must be anchored (crimped or otherwise tackified) immediately after spreading to prevent windblow. Application rates will vary based on the percent slope. Bark mulch and/or wood chips do not require crimping. The engineer will determine whether or not the wood chip mulch may remain in place, be cultivated or be modified for permanent seeding.

806.8.6.3.3 Temporary Berms - Erosion Control

A temporary berm is a temporary ridge of compacted soil, with or without a shallow ditch, constructed at the top of slopes or transverse to centerline on fills. The purpose of these ridges is to divert storm runoff from small areas away from steep slopes and direct this water to temporary, stabilized outlets where the water can be discharged with minimum slope erosion. These ridges are used temporarily at the top of newly constructed slopes to prevent excessive erosion of the slopes until permanent controls are installed and/or the slopes are stabilized. They are also used transverse to grade to divert runoff to stabilized slope drains. Weekly (and post-runoff) inspections will be necessary to identify breeches in all temporary berms used as BMPs.

Type B Berms are constructed on the top of slopes and are intended to direct runoff water away from project slopes and toward stabilized drop down structures/pipes or stormwater detention areas, sediment capture devices, etc. They will be constructed to specified dimensions (see Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf)) and machine compacted with a minimum of three passes over the entire width of the berm with a dozer tread, grader wheel, etc. These temporary diversion structures are specified when embankment operations are shut down over extended periods of time. The top width of these berms may be wider and the side slopes flatter on transverse berms to allow equipment to pass over these berms with minimal disruption. Operation and maintenance concerns are limited to ensuring that the majority of runoff water is directed into the inlet of the slope drain. Removal of Type B Berms will normally occur when base rock is installed, prior to paving, but may be used longer if necessary.

806.8.6.3.4 Temporary Pipe Slope Drains

A temporary pipe slope drain (see Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf)) is used to carry water down slopes to reduce erosion and may consist of half-round pipe, metal pipe, plastic pipe, or flexible rubber pipe. Temporary slope drains are usually required on fill and some cut slopes at approximately 500-foot intervals or as

directed by the engineer. These structures are installed after the slope has reached its intended elevation and final grade.

All temporary slope drains will be adequately anchored to the slope to prevent disruption by the force of the water flowing in these drains. The inlet end will be properly constructed to channel water into the temporary drain. The outlet ends will usually have some means of dissipating the energy of the water to reduce erosion downstream and will have a sediment control BMP or a system of sediment control BMPs to capture sediment carried within the stormwater. Where scour at the outlet is of lesser concern due to the physical characteristics of the ditch, there shall still be sediment capture devices in the ditch or drainage outlet downgrade from the slope drain outlet. Unless otherwise specified, all temporary slope drains will be removed when no longer necessary due to the slopes being stabilized or the routing of runoff down permanent letdown structures. Upon removal of temporary slope drains, the site will be restored to match the surroundings.

806.8.6.3.5 Interception Ditches and Letdown Structures (Including Roadside & Median Ditches)

Interception ditches and letdown structures are typically permanent erosion control BMPs that capture stormwater run-on or runoff and transport it down slopes through stabilized channels. These constructed channels are meant to reduce the likelihood of gully formation and allow for the establishment of permanent vegetative cover on the face of the slope. Interception ditches and letdown structures are typically constructed in a “V”, “U”, or trapezoidal shape to concentrate water flow down the center of the structure in order to minimize the risk of break over points and flanking. They are typically lined with stone (riprap), erosion control blankets, turf reinforcement mats, or other product which is self-adjusting and capable of withstanding concentrated, erosive flows. In some instances, these ditches and letdowns may be constructed as concrete or asphalt gutters; however, these types of rigid channel liners do not allow for water infiltration and more often than not, do not have built-in energy dissipation, which can exacerbate erosion at their outlets. In addition, due to their rigid nature, concrete and asphalt-lined drainage courses often undermine and experience section loss, which leads to system failure. There are alternative BMP technologies available (e.g. ShoreMax™, ScourStop™, Flexamat™, etc.) that give a degree of rigidity, if desired, to help armor the channel, or a portion of the channel more susceptible to erosion, while still allowing permeability for vegetative growth and water infiltration, as well as self-adjustment to prevent system failure.

When designing and implementing interception ditches and letdowns, as well as roadside and median ditches, it is important to take into consideration drainage area, soil type, slope and ditch shape in order to determine if the shear stresses within the ditch will be of a high enough value to warrant a liner beyond just vegetative cover. Depending on the location of the ditch, driver safety must also be taken into consideration when choosing an appropriate ditch liner.

Refer to EPG 806.8.6.2 Non-Structural Control Measures for the benefits of existing or reestablished vegetation within ditches, swales and other areas of right of way.

806.8.6.3.6 Temporary Pipes and Temporary Construction Crossings

A temporary pipe is a conduit used temporarily to carry water under a haul road, silt fence, etc. Temporary pipes should be installed in the same manner as permanent pipe is installed on the project to assure that the water does not cause erosion around the pipe. If applicable, material to backfill the pipe should be placed in six-inch lifts and mechanically compacted, although a compaction test is not required. As additional erosion protection, temporary pipes can also be used to collect site run-on and convey it across disturbed areas on the job. Care should be taken to ensure the outlet of the temporary pipe is stabilized and adequate energy dissipation is available so as to not cause erosion of the receiving area.

Temporary pipes can also be used to convey normal and expected high flows at temporary stream crossings, preventing the contractor's equipment from coming into direct contact with the water when crossing active streams

as discussed in EPG 806.8.6.1 Construction Requirements. Any temporary structures used to facilitate construction (e.g. temporary crossings, temporary work pads) will be constructed of clean rock fill that is of sufficient size to be non-erodible under normal stream flow and also easily recoverable upon project completion. Temporary stream crossings will be sufficiently piped to allow for continuous and relatively unimpounded stream flow. The pipes will be placed to match the existing stream grade, which will allow for unimpeded aquatic life passage through the project area. Upon project completion, any temporary structure(s), including pipes and other materials, shall be completely removed and the area will be restored and stabilized.

(Note: Temporary stream crossings can act as conduits for sediment to make its way to streams, because they usually cause a gap in perimeter BMPs along streambanks. If possible, stormwater runoff should be diverted away from these structures; otherwise other BMPs must be employed to adequately protect the waterbody.)

806.8.6.3.7 Energy Dissipaters

An energy dissipater is a physical structure that is intended to reduce the erosive energy that is typically encountered down grade from a pipe or culvert. As such, these BMPs are normally permanent. Erosive energy from intense flows may also be encountered in median ditches or road ditches. Energy dissipation may be accomplished by the installation of large boulders, wood pilings, engineered concrete structures or other means approved by the engineer, following construction of the ultimate drainage channel or device. Unlike ditch checks and sediment traps, energy dissipaters are NOT intended to impound water and sediment. Energy dissipaters must be constructed in a fashion such that the water that flows through, over or around the structure is equally distributed in the discharge channel and does not exacerbate or cause a resultant erosion problem.

806.8.6.3.8 Seeding and Mulching

806.8.6.3.8.1 Temporary Seeding and Mulching (MO Specifications Sec 802

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=12) and Sec 805

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=12))

This work shall consist of preparing and fertilizing a seedbed, furnishing and sowing of seed, and mulching. The purpose of temporary seeding and mulching is to produce a quick ground cover of annual grasses to reduce erosion in disturbed areas that are expected to be either re-disturbed or permanently seeded at a later date. It should be used as necessary to prevent erosion and decrease reliance on and potential costly maintenance of sediment control BMPs. For project planning purposes, it is important to understand that temporary vegetative cover will begin to lose its effectiveness within 6 to 12 months depending on site conditions.

Seeding and/or mulching will be a continuous operation on all cut and fill slopes, waste sites, and borrow areas during the construction process. Disturbed areas shall be seeded and mulched when and where necessary to eliminate erosion. In designated areas seeding and/or mulching shall be done as soon as possible after completion of the earthwork, not to exceed 14 days (7 days on slopes steeper than 3:1), weather permitting. Most disturbed areas, with the exception of the road grade itself, shall be seeded and mulched during the fall to establish vegetative cover prior to winter shutdown. If final grade has been achieved, this operation should consist of establishing permanent vegetation, not temporary.

Temporary mulch placed over temporary seed mixtures shall be applied in accordance with the provisions of Sec 802.2.1 of the Missouri Standard Specifications. Fertilizer shall be applied at the rate specified for permanent seeding. Lime will usually not be required for temporary seeding but will be applied according to governing specifications when a permanent seed mixture is used.

806.8.6.3.8.2 Permanent Seeding and Mulching (MO Specifications Sec 805

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=12))

Permanent seeding and mulching following the temporary seeding will be performed according to the Missouri Standard Specifications Sec 805 and should typically be permitted during favorable seeding seasons only. It is important to remember that temporary seeding and mulching can be used to cover up bare soil during times that are not conducive to applying permanent seeding. Then, when conditions are more suitable for permanent seeding, it can be applied over/through the temporary seeding stubble. Or, in some cases, it may be necessary to mow the temporary seeding stubble and then apply permanent seeding.

Any revisions or deviations from contract seed mixtures and applications must be approved by the Roadside Section of MoDOT's Maintenance Division.

806.8.6.3.9 Fiber Reinforced Matrix (FRM)

Fiber Reinforced Matrix (FRM) is a hydraulically applied (spray-on) erosion control product that bonds to, and blankets bare soil. It is typically applied with a truck or trailer mounted sprayer or by walking the affected areas with a hose sprayer. According to manufacturers, FRMs lock in moisture and nutrients to promote seed germination. Since these products are applied through spray-on application, they can conform to the contours of a slope and therefore can be applied to rough seedbeds. These products can be applied to all soil types on any slope and can be used in place of any of the erosion control blankets (ECBs) discussed in EPG 806.8.6.3.10 Erosion Control Blankets and Turf Reinforcement Mats, below. However, these products are only to be used as slope protection, and are not designed to withstand concentrated flows within ditches, drainages or streams. It is important when using these products to apply them according manufacturer's specifications and to assure there is complete surface coverage on the affected area to prevent potential failure due to improper application. In order to accomplish this, it is important to spray slopes from multiple, varying directions. In some instances, especially on longer and/or steeper slopes, it may be necessary to install slope disruptors (wattles/socks/logs/etc.) perpendicular to the sheet flow to decrease runoff velocities down the face of the slope and protect the FRM application from concentrated flows. Manufacturer recommended application rates are summarized in the table below. Examples of FRMs include products such as Flexterra[®], Flexible Growth Medium[™], EcoFlex[™] and Flex Guard[®].

Slope Condition	Application Rate (lbs/Acre)
< 3H:1V	3000
> 3H:1V and < 2H:1V	3500
>2H:1V and < 1H:1V	4000
>1H:1V	4500

To ensure product quality and performance, all FRMs must meet the following specifications:

Minimum FRM Performance and Physical Requirements Property		Required Value	
Thermally Processed Fiber by Weight		75% ± 10%	
100% bio-degradable Interlocking Fibers		5% ± 2%	
Organic Tackifiers and Activators		10% ± 2%	
Moisture Content		10% ± 3%	
Organic Matter		90% minimum	
Color		Colored to contrast application area, shall not stain concrete or painted surfaces.	
FRM Property		Test Method	Required Value
Physical	Mass Per Unit Area	ASTM D6566*	12.0 oz/yd ² minimum

	Thickness	ASTM D6525*	0.22 in. minimum
	Ground Cover	ASTM D6567*	99% minimum
	Wet Bond Strength	ASTM D6818*	9 lb/ft
	Water Holding Capacity	ASTM D7367	1500% minimum
	Flexural Rigidity (wet)	ASTM D6575*	5 oz-yd maximum
Endurance	Functional Longevity	ASTM D5338	Minimum of 12 months
Performance	Cover Factor	MoDOT Approved Large Scale Testing	0.01 maximum
	% Effectiveness	MoDOT Approved Large Scale Testing	99% minimum
	Cure time	MoDOT Approved Large Scale Testing	98% Effective 2 hours after application
	Vegetation Establishment	ASTM D7322*	800% minimum
Environmental	Ecotoxicity	EPA 2021.0	96-hr LC50 > 100%
	Effluent Turbidity	MoDOT Approved Large Scale Testing	100 NTU Maximum
	Biodegradability	ASTM D5338	100% Minimum
* ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified to accommodate Hydraulic Erosion Control Products (HECPs).			

806.8.6.3.10 Erosion Control Blankets and Turf Reinforcement Mats

Erosion control blankets (ECBs) and turf reinforcement mats (TRMs) are designed to protect and reinforce vegetation from erosive forces until it can become established, or in the case of TRMs, in perpetuity. ECBs and TRMs are typically manufactured with straw, wood fiber (excelsior), jute, coconut coir fiber and synthetic materials or combinations of these materials.

ECBs are typically used to prevent sheet, rill, or gully erosion on slopes and some lower flow channels. TRMs may be used on steep slopes or slope areas with concentrated flow, but are typically used in channels. Since ECBs have a limited life expectancy (longevity) they are considered to be "temporary" erosion control measures; however, most TRMs are composed of interwoven layers of geosynthetic materials such as polypropylene, nylon and PVC netting, which protects from both bio and photodegradation and allows for permanent vegetative reinforcement. At culvert outlets, overflow structures or transition areas, it may be necessary to use a transition mat (e.g., ScourStop™, ShoreMax™, etc.) directly over the TRM in order to add additional scour protection in these highly erosive areas.

Slopes should be stabilized as soon as possible after grading work is completed. **ECBs, TRMs, or an equivalent erosion control practice is recommended for most slopes steeper than 1V:3H (3:1), depending on soil type.** Protecting slopes from erosion requires several actions that must be taken together. No single approach will be successful, especially if the slope is long, steep, or has highly erodible soils. Even when using blankets or mats, it may be necessary to incorporate temporary berms and slope drains, slope disruptors and other BMPs to ensure slope stabilization.

All ECBs and TRMs shall be installed according to the manufacturer's recommendations, including overlap and stapling guidelines. Prior to installation of blankets or mats the ground should be smooth, with no large rocks,

vegetation or rills on the surface. Areas where blankets are to be used shall be properly prepared with topsoil or soil conditioning, fertilized (if required), and seeded before blankets are placed. The blankets shall be placed smoothly, but loosely, on the soil surface without stretching. Blankets at the top of the slope should be trenched in beyond the crest of the slope to avoid undercutting. Any overlap joints shall be lapped in the direction of water flow.

Blankets and mats should be inspected at the same frequency as all other erosion and sediment control items. Malfunctions must be repaired in a timely manner or else slope shaping, grading and reinstallation will be required. Removal is not necessary or required because the material will decay and break down on its own or, in the case of TRMs, permanently reinforce the vegetation.

Product requirements for ECBs and TRMs can be found within Sec 1011 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=14) . ECBs and TRMs meeting MoDOT specification requirements each have their own physical description that can be obtained from the manufacturer. Providing the physical description of all ECBs or TRMs would be unnecessary and redundant for the purposes of the SWPPP.

806.8.6.4 Sediment Control Measures

As previously stated, the emphasis on MoDOT projects should be erosion control, focusing on covering up exposed soil, preferably with permanent vegetation, rock, pavement, etc., as soon as practicable in order to protect the soil surface and keep soil particles from dislodging and entering stormwater. While erosion control should be the primary focus, it is important to back up erosion control efforts with appropriate and effective sediment control. Sediment control is most effective when incorporating a system of structural BMPs (treatment train) and focusing efforts on combatting sediment as close to its source as possible.

Understanding soil types is important when designing and implementing sediment control BMPs. Sand and silt consist of larger particle sizes that will fall out of suspension in stormwater more readily than clays. Clay particles are very fine and tend to stay in suspension for significant periods of time. Traditional sediment control BMPs, such as silt fence and ditch checks, are most effective at removing sand and silt from suspension. Larger impounding BMPs, such as sediment basins and sediment traps, are also effective at removing sand and silt, but can be effective at removing clay, due to prolonged impoundment. Even these impoundments may not successfully remove clay particles from suspension. In these situations, it may be necessary to include flocculants within a BMP system to remove excessive clay from stormwater prior to discharge from the project site. Flocculants are discussed in more detail in EPG 806.8.13 Turbidity Reduction and Advanced Treatment Systems.

The following sediment control measures should be used in combination with erosion control practices to treat stormwater and minimize sediment loss from MoDOT projects.

806.8.6.4.1 Sediment Basin

A sediment basin is a large sediment capturing device that can be constructed through excavation, or by constructing a dam across a low drainage swale to trap and store water and sediment that may not be caught by upgrade erosion and sediment control measures. Sediment basins can be temporary or permanent. Both permanent and temporary basins should be constructed with defined side slopes and rock riprap placed in inlet and outlet areas. (Refer to Standard Plan 806.10 (http://www.modot.org/business/standards_and_specs/documents/80610.pdf) .) Sediment basins shall always have stabilized outlets designed to discharge water from the surface of the basin. The stabilized outlets typically consist of one, or a combination of the following: rock, a riser pipe, or a surface skimmer (e.g., Faircloth Skimmer[®]). As a general rule, basins should be designed and constructed twice (minimum) as long as wide in order to maximize time of concentration within the structure. To add additional sediment removal capability to basins, baffles can be designed within the basin to slow stormwater flow and

increase treatment time within the basin. Basically, the longer the water takes to get from the inlet of the basin to its outlet, the more effective the treatment and the better the water quality at the outfall.

Sediment basins are required (unless infeasible due to site constraints) when large disturbed areas (>10 acres) concentrate flow to one discharge point, but they should be considered for any disturbed area, 5 acres or larger, which drains to one discharge point. The inlets of these sediment basins shall be constructed with a wide cross-section and minimum grade to prevent turbulence and allow deposition of the soil particles. Upon construction of the basin, the side slopes of the basin should be seeded down with either annual or perennial vegetation or otherwise stabilized to protect the slopes from erosion. Discharges from the basin shall not cause scouring of the receiving area or stream.

The location of sediment basins will be shown on the plans. Sediment basins should be designed to a sufficient size to contain a volume of at least a 2-year, 24-hour storm for the area draining to the basin, or, if this calculation has not been performed, then a basin should be designed to contain a volume of 3600 cubic feet per each acre of disturbed area which drains to the basin. Where the use of a sediment basin of sufficient size as described above is impractical it should be documented in the SWPPP and other similarly effective BMPs must be employed to minimize sediment loss from MoDOT right of way. These similarly effective BMPs or BMP systems could include, but are not limited to sediment traps, ditch checks, type C berms, etc., and the use of appropriate erosion control items to cover up exposed soil. An explanation for selecting these similarly effective BMPs instead of a basin will be documented in the project SWPPP.

Sediment basins should be installed at the time of clearing and grubbing, and will normally remain in service until all disturbed areas draining into the structure have been satisfactorily stabilized. Once vegetative or other stabilization is achieved, the engineer will determine whether a sediment basin is to remain as a permanent feature. If a sediment basin is to be permanent, its slopes shall be stabilized with rock riprap or equivalent (see Standard Plan 806.10). If use of a sediment basin is to be discontinued, all excavations are to be backfilled and properly compacted, fill material removed, and the existing ground restored to its natural or intended condition.

Accumulated sediment shall be removed from the basin when the basin is no more than half full. Accumulated sediment removed from sediment basins shall be disposed of in locations where it will not erode into construction areas or waters of the state.

806.8.6.4.2 Sediment Trap

A sediment trap is a temporary sediment collection structure that is used for sediment control purposes. If properly maintained, the life expectancy of these structures can be approximately 2 years. Sediment traps will be in place prior to clearing and grubbing operations and shall remain in place until adequate stabilization to prevent erosion (vegetative cover, rock, concrete, etc.) is established upgrade of the structures. In situations where long-term maintenance issues are absent, and permanent vegetation has established, sediment traps may be left in place as a permanent structure as long as there is no threat to the natural or human environment.

Sediment traps may be constructed of rock (as per the MoDOT Standard Plans) or other non-erodible material sufficient to temporarily impound water, or may be a simple excavated pit. The length and height of the sediment trap depends on the volume of water that flows through the drainage structure and the width of the drainage channel. Sediment traps may be placed downgrade of a drainage structure outlet to prevent sediment from leaving MoDOT right of way. When a ditch drains into a stream, the sediment trap will be placed at the drainage ditch outlet. Sediment traps are not appropriate where impounded sediment and gravel could accumulate inside of the culvert. Sediment traps may also be constructed by placing a rigid, blocking structure (wood, steel, concrete) across the inlet or upstream opening of a pipe or culvert. This device can be referred to as a culvert block sediment trap (CBST). When using this device, heavy sediment particles will settle in front of the structure and clearer water will pass over the device and through the pipe.

Sediment traps are not typically appropriate in streams that are regulated by the US Army Corps of Engineers under Section 404 of the Clean Water Act. However, certain construction within the regulated channel may necessitate their use. The design of a sediment trap in this situation must be approved by the Design Division's Environmental and Historic Preservation section prior to inclusion in the plans.

Sediment traps may be dewatered through a single riser pipe, over a stabilized spillway (rock-lined, lined with erosion control blanket or turf reinforcement matting, vegetated), or, where applicable, allowed to filter through the interstices of a constructed rock barrier.

The location of sediment traps will be shown on the site plans. Accumulated sediment shall be removed from the trap when sediment has accumulated to 1/2 the height of the structure, or if an excavated pit, 1/2 of the original depth. Accumulated sediment removed from the sediment traps shall be disposed of in locations where sediment will not erode into construction areas or waters of the state. Discharges from the sediment trap shall not cause scouring of the receiving area or banks or bottom of the receiving stream.

Rock sediment traps will be constructed in accordance with Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf) and Sec 806.60 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=12) . Estimated quantities for each trap located on the project will be shown to the nearest cubic yard.

806.8.6.4.3 Ditch Checks

Ditch checks are also considered as erosion control measures.

MoDOT has two categories of ditch checks: rock and alternate ditch checks. These erosion and sediment control structures are typically used when the road ditch has been "cut" or "rough cut" to its final or near final dimensions, before the application of seed and mulch; however, they may also be installed prior to achieving final ditch grade in order to prevent erosion and protect from sediment loss.

Rock Ditch Checks are the predominant ditch check to be used on MoDOT projects. Rock ditch checks can be specified in most drainage areas where ditch slopes are 10 percent or less, and where expected ditch flow volumes and velocities are high. For scenarios that exceed the criteria established above, a combination of rock ditch checks and erosion control blankets (ECBs) or turf reinforcement mats (TRMs) should be used. *(Note: ECBs or TRMs may be designed into and used in any ditch or drainage regardless of the criteria outlined in this article.)*

Rock ditch checks will typically be constructed of rock with a predominant size between 4 in. and 12 in., but this size may be adjusted to incorporate larger sizes if site conditions warrant. They will have a minimum effective height of 18 in. as measured in the field (see Standard Plan 806.10 (http://www.modot.org/business/standards_and_specs/documents/80610.pdf)). In areas of clay soils, where additional filtration may be needed, the upgrade face of the check can be capped with smaller stone, filter fabric or another approved filtering media. In some cases, it may also be necessary to place a section of ECB or geotextile beneath the rock ditch check and extending downgrade of the structure to prevent the rock from settling into the soil beneath and/or protect from downstream scour within the ditch line.

Experience and history have shown that well-constructed rock ditch checks can withstand more intense ditch flows than alternate ditch checks. For this reason rock ditch checks or sediment traps should be used at project points of concentrated discharge (i.e., outfalls). The last two ditch checks, in any ditch check system should be rock ditch checks or one rock ditch check followed by a sediment trap.

Alternate Ditch Checks should be considered as an alternate to rock ditch checks in areas where there are safety concerns for the traveling public or other constraints where there would be concern with installing rock. These devices can typically be used in smaller drainage areas (generally 3 acres or less), with ditch slopes of 4 percent or

less, and where expected ditch flow volumes and velocities are small (see Standard Plan 806.10 (http://www.modot.org/business/standards_and_specs/documents/80610.pdf)). These thresholds may be exceeded at the approval of the engineer. If the total number of alternate ditch checks needed on a project is minimal, it is advisable to just specify all ditch checks as rock for simplicity of contract administration.

Alternate ditch checks should have an effective height of at least 9 in. as measured in the field and should be installed in accordance with the manufacturer's recommendations or as outlined in this SWPPP.

Alternate Ditch Checks can include the following or other engineer approved devices:

Triangular Silt Dike®

EnviroBerm® Porous Sediment Control System (In combo with ECB or TRM)

GeoRidge/GeoRidge Biodegradable (Nilex) (In combo with ECB or TRM)

Compost Filter Berms (1'(H) x 2'(W)) (Covered with biodegradable ECB/TRM)

Sand Bags

Fiber Rolls, Sediment Logs, Compost Filter Socks – staked and > 9" effective height and must be used in combination with ECBs or TRMs as a channel liner beneath, unless used in a ditch with sufficient existing vegetative cover to prevent erosion.

(Important: Straw wattles, straw bales and geotextile silt fence are no longer acceptable as a ditch check BMPs.)

Each type of ditch check (particularly the tubular/cylindrical/triangular products) will have specific directions for installation. In all cases care shall be exercised so as to install the device according to manufacturer specifications. Effectiveness may be compromised if not installed correctly.

Ditch checks shall be placed and constructed according to Standard Plan 806.10 which shows the spacing for ditch checks. The estimate of the required number of ditch checks is based on an effective height of 9 in. or 18 inches. In some cases local conditions may dictate some deviation from the dimensions and shape that are shown in the Standard Plans; however, deviations from Standard Plans must still ensure that sediment capture and erosion control is occurring.

Ditch checks shall be checked for sediment accumulation after each runoff event. Sediment shall be removed when it reaches 1/2 of the original height, or before. Sediment removal will include removal and disposition in a location where it will not erode into construction areas or waters of the state. Inspections shall be made to ensure that the center of the check is lower than the edges. This will ensure that water overflow will be directed into the middle of the roadway ditch. Erosion caused by high flows around the edges of the ditch check shall be identified in routine inspections and shall be corrected to protect backslopes and inslopes, as well as the integrity of the BMP.

Ditch checks shall remain in place until the engineer directs that they be removed once adequate stabilization (vegetative cover, rock, concrete, etc.) upgrade of the structures has been achieved in accordance with the permit. Upon removal, the contractor shall remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the engineer, and establish stabilization on all bare areas. As a general rule for rock ditch checks, once the area has reached final stabilization, any collected sediment should be removed and rock ditch checks can be graded out within the ditch line, serving a similar purpose as a liner. In rare cases, rock ditch checks may remain in place permanently, and resultant accumulated sediment shall be allowed to develop vegetative cover as a permanent feature of the right of way. Similarly, biodegradable structures and their accumulated sediment may be allowed to remain in place if the engineer determines that removal will destabilize the ditch. In cases of compost, mulch, etc. filled checks, the wooden stakes should be pulled and the biodegradable netting cut to encourage more rapid degradation. If the netting is non-biodegradable, the netting shall be cut and removed along with the stakes, but the biodegradable filling may be left to decompose.

806.8.6.4.4 Silt Fence (MO Specifications Sec 624

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=9) and 1011

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=14))

Use of a silt fence consists of furnishing, installing, maintaining, and removing a geotextile barrier fence designed to remove suspended particles from water passing through the fence. Silt fence is a temporary sediment control measure to control sheet flow along the edge of the right of way where runoff attempts to leave the project onto an adjacent property or into an adjacent body of water or wetland. Silt fence must never be used in concentrated flow to cross a ditch, stream or drainage channel, and in no case installed downgrade from a pipe or culvert.

There are several construction requirements for silt fences. Where possible, silt fencing should be installed in existing vegetation, outside of, or at the edge of project clearing limits, so that a buffer of undisturbed soil and vegetation remains on both sides of the fence. Fence construction shall be adequate to handle the stress from hydraulic and sediment loading. Geotextile at the bottom of the fence shall be entrenched. The trench shall be backfilled and the soil compacted over the geotextile. When two sections of geotextile silt fence come together or if a new run must be started, the fence shall be overlapped as indicated on the standard drawings (see Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf)).

As a general rule, geotextile silt fence, especially non-wire reinforced geotextile silt fence, should not be used as inlet protection, particularly around culvert and drop inlets where high volume, concentrated flows are expected, except in the instance described in EPG 806.8.6.4.6 Inlet Controls. Geotextile silt fence is also not appropriate for use as ditch checks.

Post spacing shall not exceed 8 ft. for wire-backed fence installations or 5 ft. for self-supported installations. Posts shall be driven a minimum of 24 in. into the ground. Where rock is encountered, posts shall be installed in a manner approved by the engineer, or an alternative BMP may be selected. Closer spacing, greater embedment depth and/or wider posts shall be used as necessary in low areas and soft or swampy ground to ensure adequate resistance to applied loads. In low swales, where concentrated flows may form, consider using a ditch check or sediment trap in lieu of silt fence. If heavy sediment or runoff loading is expected against the silt fence, the use of metal “T” posts should be considered in lieu of wooden post stakes.

When wire support fence is used, the support wire shall be fastened securely to the up-slope side of the post. The support wire shall extend into the trench a minimum of 2 in. and extend a maximum of 36 inches above the original ground surface. When self-supported fence is used, the geotextile shall be securely fastened to fence posts.

When silt fence is used as a perimeter sediment control device it will generally be installed at the time of clearing and grubbing, and must be maintained for as long as necessary to contain sediment from runoff. Silt fence should be installed on the contour when possible, perpendicular to sheet flow, to prevent overtopping or overloading at single points. If silt fence is run down a grade, not perpendicular to sheet flow, J-hooks should be installed into the silt fence system to dissipate energy and capture runoff so as not to undermine the fence or overwhelm the system at a low point. J-hooks should be installed toe to top, similar to ditch checks, with the tail of the downgrade J-hook terminating behind the leading edge of the previous (see Standard Plan 806.10). All silt fences shall be inspected as part of MODOT’s routine inspections. It is also recommended that casual daily inspections be made during periods of prolonged rainfall. Common deficiencies to watch for during silt fence inspections include tearing, undermining and collapsing.

In addition, review of the location of silt fences should be made in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, additional silt fences, or another appropriate BMP shall be installed as approved or directed by the engineer. If silt fence is no longer necessary in an area, it should be removed to negate maintenance and liability.

Sediment deposits shall be removed and disposed of when the deposit approaches 1/2 the height of the fence or sooner. If required by heavy sediment loading, a second silt fence shall be installed as directed by the engineer. Installation of a second silt fence will sometimes preclude sediment cleanout or repair to the original silt fence. In such cases the damaged silt fence will be removed at project close out when other temporary BMPs are removed.

The silt fence shall remain in place until areas that drain to the fencing are stabilized in accordance with the permit and the engineer directs that it be removed. Upon removal, the contractor shall remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the engineer, and establish vegetation on all bare areas. Biodegradable silt fence (such as some of the example products listed below) need not be removed unless directed by the engineer. If the engineer determines that silt fence shall remain in place for a period of time after the job is closed out, arrangements will be made by MoDOT Construction personnel for the contractor or MoDOT Maintenance personnel to remove the fence once the area is sufficiently stabilized in accordance with the permit.

At the discretion of the engineer the following product examples or other approved BMPs, such as mulch berms, may be substituted for perimeter geotextile silt fence. These devices should be installed in accordance with manufacturer recommendations. In the case of the wattles, socks and log devices, if practical and possible, a cradle trench should be created to lay the product in to ensure proper contact with the ground surface. This may not be appropriate if installing these devices in areas with existing grass cover, such as yards, or in areas with shallow utilities or bedrock beneath. Even so, care should be taken to ensure flush contact with the ground surface. Thought should also be put into product choice based on expected longevity, as some devices listed below will decompose or break down more quickly than others, and may require replacement or multiple replacements during the life of a job. In general, perimeter silt fence installations should have a minimum 9" in effective height, as measured in the field, unless site conditions warrant a higher or lower effective height.

Example Products:

- Sediment STOP
- Terra-Tubes
- Sediment Logs, Wattles
- Compost Filter Socks/Berms
- Triangular Silt Dike

806.8.6.4.5 Rock/Mesh Sediment Control Fence and Inlet Protection Device

In situations when higher velocity stormwater flows are expected around the perimeter of a construction site, a rock/mesh sediment control fence should be installed in lieu of geotextile or other silt fence applications. This device is constructed using a 4 ft. wire mesh (hardware cloth – 24 gauge, 1/4 in. openings) folded in half to form a 90° angle. This mesh is then wired to, and supported by 5 ft. metal "T" posts spaced 3 ft. apart and driven approximately 2 ft. into the ground. Lastly, a layer of grade 4 or grade 5 aggregate for drainage (Sec 1009 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=14)) is placed against the mesh, with a minimum height of 12 in., but preferably 18 inches. (Refer to Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf) .)

Use this device in lieu of other silt fence applications at the toe of fill sections, especially along streams and wetlands and in other areas where there is insufficient right of way to construct better impoundment devices, such as sediment basins or sediment traps. As with silt fence applications, the sediment control fence should be placed perpendicular to stormwater flow, allowing the water to pass either over or through the rock/mesh sediment control fence, never around it.

This same device can be modified for use around drop inlets, creating a closed ring or box around the inlet opening using the same installation guidelines outlined above.

Rock/mesh sediment control fences shall be inspected during weekly and post-runoff inspections for structural damage, undercutting, sediment buildup, or lack of drainage due to sediment clogged stone. Sediment deposits shall be removed and disposed of when the deposit approaches 1/2 the height of the fence or sooner. Accumulated sediment removed from the fence shall be disposed of in locations where sediment will not erode into construction areas or into waters of the state. Also, if the filter stone (aggregate for drainage) becomes sediment-clogged and no longer serves as a filter, it may be appropriate to replace it with new stone.

The rock/mesh sediment control fence shall remain in place until areas that drain to the fencing are stabilized and the engineer directs that it be removed. Upon removal, the contractor shall remove and dispose of any excess sediment accumulations, grade and dress the area to the satisfaction of the engineer, and establish vegetation on all bare areas. If the engineer determines that sediment control fence shall remain in place for a period of time after the job is closed out, arrangements will be made by MoDOT Construction personnel for the contractor or MoDOT Maintenance personnel to remove the fence once the area is sufficiently stabilized.

806.8.6.4.6 Inlet Controls

Storm drain (culvert, drop or curb) inlet protection measures prevent soil and debris from entering storm drain inlets. Temporary inlet protection is implemented at existing inlets prior to land disturbance, and new inlets are to be protected as they are put into service. Effective storm drain inlet protection must be provided throughout the project for all inlets susceptible to receiving sediment until all sources with potential for discharging to an inlet have been stabilized. At that time inlet controls can be removed.

As the conditions or operations change during a project, the sediment control BMP protecting the storm drain inlet may need to be modified to ensure proper effectiveness for sediment filtration and capture. Also, limiting the amount of sediment entering a storm sewer will reduce the need to clean out pipes at the end of the project.

The following types of items are generally considered for use as inlet protection:

Curb Inlet Protection:

- Sand Bags/Rock Socks
- Wattles/Compost Filter Socks/Fiber Rolls/Sediment Logs, etc.
- Various Filter Devices and Inserts (e.g., but not limited to, FLEXSTORM Inlet Filters, Silt Saver Inlet Filter, Big Red Curb Inlet Protector and Dandy Products)
- Wood, Steel or Other Barricades

Drop or Pipe/Box Inlet Protection (Shall have a minimum 9 in. effective height):

- Rock/Mesh Inlet Check (NEW – see EPG 806.8.6.4.5 Rock/Mesh Sediment Control Fence and Inlet Protection Device)
- Rock Ditch Checks
- Triangular Silt Dike®
- Sand Bags
- Various Filter Devices (e.g., but not limited to, Silt Saver Inlet Filter, Big Red Area Inlet Protector and Dandy Products)
- Wood (CBST, as discussed in EPG 806.8.6.4.2 Sediment Trap), Steel or Other Barricades

(Note: Item selection may vary depending on the type and design of inlet to be protected and careful consideration should be made with inlet protection to ensure any impounded water will not flood streets, buildings, homes, etc..)

As a general rule, geotextile silt fence, especially non-reinforced geotextile silt fence, should not be used as inlet protection, particularly around culvert and drop inlets where high volume, concentrated flows are expected. An

exception to this is if a constructed wood or steel frame is erected around the inlet and this frame is then wrapped with geotextile material. In this application, it is recommended for additional support and protection that wire reinforcement be wrapped around the frame and then the geotextile applied over the wire.

Each type of inlet control device (particularly the tubular/cylindrical/triangular products) will have specific directions for installation. In all cases care shall be exercised so as to install the device according to Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf) or the manufacturer's specifications. Effectiveness may be compromised if not installed correctly.

During construction, elevated curb inlets and median inlets, as well as excavations around inlets, may serve as "riser pipes" as long as they are sufficiently higher (approximately 9 in. or more) than the existing grade. Sediment that accumulates at the base of the riser pipe following stormwater events shall be removed when it reaches 1/2 of the original height of the riser pipe. Once the desired grade has been achieved and the inlet becomes flush to that grade, subsequent inlet protection is required.

806.8.6.4.7 Temporary Berms — Sediment Control

Type C berms are specified at the toes of spill slopes around bridge construction operations and will usually be constructed to the specified dimension (see Standard Plan 806.10 (http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf)). However, dimensions may deviate from those shown on the standard drawings based on site limitations. A straw layer, erosion control blanket, or geotextile is typically required on the upgrade side of the Type C berm to improve stormwater filtration. This additional filtration layer may be removed if the character of the rock material is sufficient to minimize sediment loss from the project. In certain construction operations, Type C berms may be used as perimeter protection where significant stormwater flows and/or sediment loading is expected, which would overwhelm silt fence applications. Installation will generally precede land disturbance activities, unless some clearing is necessary in order to gain access to the site. Type C Berms must be installed above the regulatory "ordinary high water mark". Type C berms are typically temporary, but may be permanent depending on the ultimate desired use of the right of way beneath the bridge. If the Type C Berm is removed, material may be used for bank stabilization, or other construction use. Bank stabilization will be in accordance with the Section 404 permit. Type C Berms shall be checked for sediment accumulation after each runoff event. Sediment shall be removed when it reaches 1/2 of the original height or before. Sediment removal will include removal and disposition in a location where it will not erode into construction areas or waters of the state.

Contract plans will show the general location of the Type C berm, but the precise location of the structure can only be determined at the time of installation and shall be field fit at the direction of the engineer to provide maximum protection, yet enable the installation of piers, bents and other improvement, as well as accommodate for movement of equipment.

(Note: Oftentimes temporary stream crossings are used in proximity to Type C berms. These crossings can cause gaps in the berm for equipment passage, which could potentially be a conduit for sediment delivery to the waterbody. Use caution when using these two practices in the same location and assure adequate protection of the waterbody. Refer to EPG 806.8.6.3.6 Temporary Pipes and Temporary Construction Crossings for more information.)

Type B Berms may be used as a temporary perimeter control structure where slopes are less than 2% and permanent vegetation is present on the downgrade side of the structure. They will be constructed to specified dimensions (see Standard Plan 806.10) and will be machine compacted with a minimum of three passes over the entire width of the berm with a dozer tread, grader wheel, etc. When using a Type B berm for perimeter protection, it should be seeded and mulched with temporary, or, if desired, permanent vegetative cover. Weekly and post-runoff inspections will be necessary to identify berm erosion or breeches. Removal of Type B Berms will occur when grading operations cease and final contours are achieved or when other BMPs have been installed negating

the need for the berm. Removal will usually occur just before the application of seed and mulch or other soil stabilization measures.

806.8.6.4.8 Compost Filter Devices

Two categories of compost filter devices are used as erosion and sediment control BMPs on MoDOT projects: compost filter socks/ logs and compost filter berms. *(Note: Compost can also be used as a soil amendment and sometimes as a mulch to enhance vegetative establishment.)*

Compost Filter Socks consist of compost filter media (compost, or non-treated wood) encased within a three-dimensional fabric tube for purposes of erosion, sediment and pollution control. Compost filter socks are typically used for perimeter protection and are an acceptable alternative to geotextile and other silt fence applications described in EPG 806.8.6.4.4 Silt Fence. Compost filter socks are also acceptable alternate ditch checks as described in EPG 806.8.6.4.3 Ditch Checks. Specified effective height, as measured in the field, shall apply for both silt fence and ditch check applications. Compost filter socks shall be installed according to the manufacturer's specifications or Standard Plan 806.10

(http://www.modot.mo.gov/business/standards_and_specs/documents/80610.pdf) , including ground preparation and staking requirements. Though compost filter socks are commonly used for perimeter protection and alternate ditch checks, other uses may include: curb and drain inlet protection; slope interruption; protection along the toe of stream and channel banks; on compacted and frozen soils, or pavement where trenching is difficult or impossible; and around sensitive resources where trenching may disturb the resource.

Sediment shall be removed once it has accumulated to one-half the original height of the sock. Compost filter sock shall be replaced whenever it has deteriorated to such an extent that the effectiveness of sock is reduced. Compost filter socks shall remain in place until disturbed areas draining to the devices have been permanently stabilized in accordance with the permit. Upon removal of compost filter socks, the wooden stakes should be pulled and the biodegradable netting cut to encourage more rapid degradation. If the netting is non-biodegradable, the netting shall be cut and removed along with the stakes, but the compost filling may be left to further decompose and act as a soil amendment.

Compost or non-treated wood used for compost filter sock filter media (filler material) shall be weed, disease, and pathogen free and derived from a clean source of woody organic matter. Compost shall be produced using an aerobic composting process meeting CFR 503 regulations including time and temperature data. The filler material shall be free of any refuse, contaminants or other materials toxic to plant growth. Test methods for the items below should follow U.S. Composting Council Test Methods for the Examination of Composting and Compost guidelines for laboratory procedures:

- pH – 5.0-8.0 in accordance with TMECC 04.11-A, “Electrometric pH Determinations for Compost”
- Particle size – 99% passing a 2 in. (50mm) sieve and a maximum of 40% passing a 3/8 in. (9.5mm) sieve, in accordance with TMECC 02.02-B, “Sample Sieving for Aggregate Size Classification”.
(Note- In the field, product commonly is between 1/2 in. [12.5mm] and 2 in. [50mm] particle size.)
- Moisture content of less than 60% in accordance with standardized test methods for moisture determination.
- Bulk density shall be a minimum of 14 lbs/cu ft (dry weight)
- Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.
- The engineer may request a sample for approval prior to being used and must comply with all local, state and federal regulations.

Compost Filter Sock Fabric Specifications				
Material Type	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)

Material Characteristics	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	8"	8"	8"	8"
	12"	12"	12"	12"
	18"	18"	18"	18"
	24"	24"	24"	24"
	32"	32"	32"	32"
Mesh Opening	1/8" - 3/8"	1/8" - 3/8"	1/8" - 3/8"	1/8" - 3/8"
Tensile Strength	26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	-	100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	9 months	6 months	1 year	2 years
Note: All materials must be knitted. Extruded materials not permitted.				

Compost Filter Berms are temporary barriers of compost placed along the perimeter of a site, or at intervals along a slope, to control erosion and capture sediment from sheet flow. A filter berm can also be used as a check dam in small drainage ditches as described in EPG 806.8.6.4.3 Ditch Checks. Loose applied compost berms (i.e., mounded compost) should be anchored in place (covered) with ECB for stability. To anchor the compost effectively, place the ECB first and then install the compost along and atop the downgrade edge of the ECB and wrap the ECB over the compost in the direction of flow and anchor with staples or an equivalent.

Composts used in filter berms are made from a variety of feedstocks, including municipal yard trimmings, food residuals, separated municipal solid waste, biosolids, wood chips and manure.

Compost filter berms can be used in place of traditional sediment and erosion control tools such as geotextile silt fence. As such these berms can be installed at the time of clearing and grubbing, or as needed throughout the construction process, and will remain in place until the site is stabilized. Weekly and post-runoff inspections will be necessary to identify berm erosion or breeches. Sediment shall be removed once it has accumulated to one-half the original height of the berm.

Post-construction removal is not required because the compost and ECB are biodegradable. However, unvegetated berms are often broken down once construction is complete and the compost is sometimes spread around the site as a soil amendment or mulch.

806.8.6.4.9 Mulch Berms

The use of shredded or chipped mulch for berms or temporary groundcover is an acceptable reuse of cleared trees and brush from MoDOT projects. Mulch berms are used for perimeter protection and are an acceptable alternative to geotextile and other silt fence applications described in EPG 806.8.6.4.4 Silt Fence. As such, these devices are used to filter sheet flow and are not appropriate in ditches, drainage channels or other areas of concentrated flow.

Mulch berms are most effective when piled to a height of at least two feet, preferably installed in existing vegetation, outside of, or at the edge of project clearing limits, so that a buffer of undisturbed soil and vegetation remains on both sides of the berm. Mulch berms will generally be installed at the time of clearing and grubbing, and must be maintained for as long as necessary to contain sediment from runoff. Mulch berms should be installed on the contour when possible to prevent overtopping or overloading at single points.

Mulch berms shall be inspected as part of MODOT's routine inspections. It is also recommended that casual daily inspections be made during periods of prolonged rainfall. Where deficiencies exist, additional mulch, or another

appropriate BMP shall be installed as approved or directed by the engineer.

Sediment deposits shall be removed and disposed of when the deposit approaches 1/2 the height of the berm or sooner. A mulch berm shall remain in place until areas that drain to the structure are stabilized in accordance with the permit and the engineer directs that it be removed. Upon removal, the contractor shall remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the engineer, and establish vegetation on all bare areas.

Mulch is biodegradable and need not be removed, unless directed by the engineer. Though not required to be removed, piled mulch should be knocked down and dispersed into a thin layer of ground cover, which will aide in the breakdown of the material.

806.8.6.4.10 Brush Pile Checks/Barriers

Brush pile checks or barriers are considered to be temporary BMPs that can be effective during clearing and grubbing operations. Piled and compressed tree tops, limbs, stumps and other vegetation, when placed in a **non-jurisdictional** drainage swale or around the perimeter of a land disturbance site, can effectively impound gravel, soil and other eroded materials that otherwise may be carried off of MoDOT right of way during runoff events. Brush pile checks are not appropriate for use in jurisdictional (Section 404 of the Clean Water Act) bodies of water.

To be effective, brush piles should be compressed tight to the ground by clearing equipment at the time of installation so there is no void beneath. Brush checks and barriers are only intended to operate as stand-alone BMPs for a very short time period during initial clearing and grubbing, and should be bolstered by the installation of additional supportive measures upgrade or downgrade of the structures, such as sediment basins, sediment traps, ditch checks, etc., as soon as practicable. When these other devices are installed, the brush check/barrier may be left in place as additional filtration, if permissible, or removed.

Like other BMPs, brush piles should be inspected during required inspections to ensure that they are functioning as intended. Initial inspections following rainfall will determine their ability to impound water and sediment. If the brush pile is intended to serve as a longer term sediment control structure for an extended period of time beyond the clearing and grubbing stage, clean out and maintenance equivalent to that required for ditch checks is required.

After land disturbance has been completed, removal should be discussed before heavy equipment leaves the site. In rural situations, and where maintenance issues are absent, the brush pile may be abandoned and left to decompose on its own.

806.8.6.4.11 Straw Bales (MO Specifications Sec 802)

(http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=12)

Bales of straw are no longer acceptable sediment control BMPs on MoDOT projects and will not be used as such. Straw is acceptable as mulch when applying temporary ground cover or establishing permanent vegetative cover. Straw used as ground cover is required to be embedded or tackified per Section 802 of the Missouri Standard Specification for Highway Construction.

Straw bales are an acceptable practice used to control concrete diamond grinding residue that is discharged onto MoDOT right of way due solely to the short duration of the discharge as described in EPG 806.8.11 Diamond Grinding and Other Surface Treatments. During concrete diamond grinding operations, the straw bales are typically used in concert with other BMPs, including non-structural BMPs such as existing vegetation.

In these situations, bales of straw can be installed as ditch checks and used as a temporary means of controlling pollution by obstructing the flow of the slurry and allowing deposition of the fine cement particles. The bales should be properly staked and extend far enough up the inslope and backslope to sufficiently impound the

discharge slurry. The integrity of straw bales must be maintained for as long as they are necessary to contain the slurry. When no longer necessary to control pollution, the bales and other temporary BMPs associated with diamond grinding operations should be removed.

806.8.7 Disturbed Areas

Project plans that are discussed in EPG 806.8.2 Site Description and EPG 806.8.3 Developing/Amending Project-Specific Project Plans will identify those areas that will be cleared and graded as part of the highway development project. The plans will also identify areas that are not to be disturbed. Both disturbance and do not disturb areas are generally staked in the field.

On areas of the site where soil disturbing activities will cease and are not planned to resume for a period exceeding 14 calendar days, temporary stabilization must be initiated immediately upon knowing of the 14-day cessation, and must be completed within 7 calendar days. On portions of the project where slopes are greater than 3:1 (1V:3H), or greater than 3% and longer than 150 ft., all temporary stabilization must be completed within 7 days of ceasing operations. Temporary stabilization may include, but is not limited to the installation of sediment basins, sediment traps, ditch checks, sediment fences, and mulch; however, the preferred method of stabilization is seed and mulch.

Seeding and/or mulching will be a continuous operation on all cut and fill slopes, excess material sites, and borrow areas during the construction process.

All disturbed areas should be seeded and mulched or otherwise stabilized when and where necessary to eliminate erosion. Seeding and/or mulching shall be done as soon as possible after completion of the earthwork and preparation of the seedbed, weather permitting.

Whenever clearing, grading, excavating or other earth disturbing activities have permanently ceased on a portion of the site, final stabilization must be initiated immediately and completed within 7 calendar days. Final stabilization can be achieved by covering disturbed areas with pavement, buildings or other structures, perennial vegetation or non-erodible materials such as adequately sized rock. With respect to areas that have been seeded, vegetation cover must be at least 70% plant density with uniform coverage over 100% of the disturbed area.

For the purposes of this section, allowances to the 7-day completion period for temporary and permanent stabilization may be made due to inclement weather or adverse site conditions. If used, these allowances must be properly documented in the project SWPPP, and shall include pictures.

The following types of activities will constitute initiation of stabilization (this list is not exhaustive):

- Prepping the soil for vegetative or non-vegetative stabilization
- Applying mulch or other non-vegetative product to the exposed area
- Seeding or planting the exposed area
- Starting any of the above activities on a portion of the area to be stabilized, but not on the entire area
- Finalizing arrangements to have stabilization product fully installed in compliance with the applicable deadline for completing stabilization

Note: the term “immediately” in this subarticle means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

806.8.8 Installation and Removal

The contractor shall be required to incorporate all permanent erosion control measures into the project at the earliest practicable time. As stated in EPG 806.8.6.1 Construction Requirements, when practical, border, perimeter or outfall BMPs to control runoff from disturbed areas shall be installed or marked for preservation before general

site clearing. A limited amount of clearing may be permissible to enable the installation of outfall and perimeter controls. Stormwater discharges from disturbed areas, which leave the site, shall pass through and appropriate impediment prior to leaving the site. It may be necessary to install additional control measures during construction which were not foreseen during the design stage. Temporary controls shall also be used when needed prior to installation of permanent erosion control measures to control erosion that develops during normal construction practices.

Temporary BMPs should be removed from the project when areas they are protecting have achieved final stabilization in accordance with the permit. Oftentimes engineers and/or contractors may desire to leave all temporary BMPs in place until project completion and then have one mass removal. Though this practice is not ideal due to increased vulnerability, it is acceptable if the BMPs are continuously inspected and maintained in accordance with the permit until their removal. Also, if the engineer determines that some BMPs shall remain in place for a period of time after the job is closed out, arrangements will be made by MoDOT Construction personnel for the contractor or MoDOT Maintenance personnel to remove the BMPs once the area(s) they are protecting are sufficiently stabilized.

806.8.9 Dewatering

Dewatering of ponds, lakes, coffer dams, pits or excavations associated with construction shall be discussed at the preconstruction conference, and articulated in a written plan, which will outline a method for properly treating the water before it can re-enter a river, stream, pond, lake, wetland, etc. This plan may be amended at any time if changes are necessary.

Sec 107.10.2 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=4) requires a dike or appropriate barrier to be placed between the excavation and the stream to prevent sediment from reaching the watercourse. The structural BMPs that are identified in EPG 806.8.6.4 Sediment Control Measures are usually sufficient to remove sediment and similar pollutants prior to discharge of return water. Land application of the discharge water is a viable option when percolation into the subsurface results; however, caution shall be used to ensure that water discharge does not cause the formation of gullies in cases where pumping exceeds percolation.

With the possible exception of drilled shafts in large rivers such as the Missouri or Mississippi, return water shall not be discharged without treatment by BMPs that are approved by the engineer. The amount of return water that is pumped and subsequently discharged should be recorded in the project records and expressed as gallons per minute for the duration of the pumping activity.

806.8.10 Roadways

In order to ensure that sediment is not transported into a situation where it can be delivered off-site, stabilized construction entrances should be used when construction equipment is frequently crossing or entering paved roadways. Stabilized construction entrances are typically built with rock of sufficient size to cause mud and dirt to fall off of the tires of the construction equipment. Geotextile fabric may be necessary for placement below the stabilized entrance in some soil conditions to prevent the rock from subsiding into the soil. In muddy situations, the voids between the rocks will always fill up with soil particles and as such, additional stone will need to be applied periodically and when repair is required.

The purpose of the stabilized entrance is to reduce the amount of sediment that will be transported onto the driving surface. However, the driving surface at the point of the active crossing cannot remain clean without additional measures such as sweeping or grading.

Because it is impossible to eliminate all trackout of sediment, inspections should ensure that sediment control measures downgrade from the area of trackout are in good operating condition, especially inlet controls.

On projects where there is one primary construction entrance/exit and a large volume of equipment is expected to pass through this point, a more structural BMP may be appropriate to handle the volume of sediment. If this is the case, rumble strips, cattle guards, or wheel wash stations may be employed to effectively remove sediment. In these situations, routine maintenance will be needed to remove accumulated sediment from beneath and/or around these structures. If a wheel wash system is used, wash water should be channeled to a constructed sediment trap for treatment, unless the system has the capability to recycle the wash water. Just as with other sediment traps, once installed, the location of the trap will be shown on the inspector's site plans. Accumulated sediment shall be removed from the trap when the accumulation reaches 1/2 the height of the structure, or if an excavated pit is used, 1/2 of the original depth.

When accumulated sediment is removed from these BMPs, the material shall be disposed of in locations where sediment will not erode into the construction areas or waters of the state.

806.8.11 Diamond Grinding and Other Surface Treatments

Although diamond grinding, grooving, and other pavement surface and bridge deck treatments are not land disturbance activities, the fine material that is removed from the driving surface will become suspended in discharge water and has the potential to contaminate nearby streams if not sufficiently managed. The following shall be considered the minimum requirements for performing this work within the project limits in addition to Sec 622 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=9) and EPG 622.2.1 Construction Inspection for Diamond Grinding of Existing Portland Cement Concrete Pavement.

The contractor shall submit to the engineer for approval in writing prior to the pre-construction conference, the best management practices (BMPs) to be used to protect the environment, including the method of disposal whether on right of way or off-site. Dispersal of diamond grinding residue on the right of way, where allowed, is the contractor's choice versus tanking and disposal. Therefore, all straw bales and other BMPs shall be at the contractor's expense. See EPG 806.8.6.4.11 Straw Bales for more information about using straw bales as BMPs.

The preferred BMP for concrete diamond grinding slurry management is land application on MoDOT right of way. When concrete slurry is dispersed on the right of way, BMPs shall be installed to keep slurry residue from entering drainage structures, waters of the state, and from leaving the right of way. At no time should asphalt diamond grinding slurry be discharged directly onto MoDOT right of way. Asphalt grinding residue must be tanked and disposed of properly.

Prior to starting work, concrete slurry or residue “no discharge zones” will be identified by the engineer with respect to the contractor’s approved BMP and residue disposal plan. Special provisions and restrictions will apply when operating in proximity to streams, wetlands, sensitive species habitat and in karst (landscapes with caves) and groundwater recharge areas.

The engineer may suspend operations during periods of rainfall or during freezing temperatures.

806.8.12 Concrete Washout

Concrete washout BMPs should be established in designated areas for all projects where concrete production or delivery is occurring. Inspectors should ensure that concrete washout is not occurring in non-designated areas of the project site. These washouts are used to contain residual concrete, concrete associated liquids and the wash water from cleaning trucks, hoppers and chutes, which typically have a high pH and could contain other chemical additives. Washout BMPs can be non-leaking plastic or clay/bentonite lined pits, a straw bale enclosure lined with plastic, a storage tank or prefabricated BMP or other structure approved by the engineer or inspector. In karst regions of the state, such as the Ozarks, extra care should be taken to ensure proper lining of earthen pits, as cracks and fissures within the bedrock could allow for direct pollution of ground water. Designated washout areas should

be located at least 50 feet away from storm drains, ditches, streams or other water bodies. Washouts should be monitored like other BMPs to ensure there are no leaks and that they are operating effectively. They should be cleaned out when they reach 75% of their design capacity. Care should be taken to ensure these structures do not overflow during storm events.

Upon completion of concrete washout on the project, the engineer or inspector should ensure proper disposal of washout materials. Washout liquids can be allowed to evaporate or be pumped out and properly disposed of. They cannot be discharged into storm drains, ditches, streams or other bodies of water. Dried concrete can be broken up and used as clean fill on the project, recycled or properly disposed of by other means.

806.8.13 Turbidity Reduction and Advanced Treatment Systems

Water clarification and the removal of turbidity will usually require the addition of flocculants, polymers, polyacrylamides (PAM), chitosan and other chemicals that cause soil particles to bind together, become heavy and settle to the bottom of a sediment trap or sediment basin.

Since settling of flocculated soil particles requires very slow moving (still) water, natural and chemical additives should never be introduced into an outfall BMP where water leaves MODOT right of way. In all cases where flocculants are used to reduce turbidity it is essential to include a sediment basin or sediment trap and a ditch liner or ditch check apron that prohibits additional erosion on the downgrade side of the ditch check.

The following Advanced Treatment Systems are options for use in MODOT projects where turbidity removal is required:

- Flocculant logs and flocculant flats that are installed directly in a ditch, pipe or culvert upgrade from a sediment basin or sediment trap.
- Flocculant treated ditch checks (i.e. fiber rolls, or compost socks/logs) that have been installed upgrade from a sediment basin or sediment trap.
- Flocculant treated rock ditch checks installed upgrade from a sediment basin or sediment trap.
- Geo ridge ditch checks with attached flocculant bags, installed upgrade from a sediment basin or sediment trap.
- Addition of granular flocculants directly into a ditch, upgrade from a sediment basin or sediment trap.
- Erosion control blankets and turf reinforcement mats that have been inoculated with flocculants, and installed upgrade from a sediment basin or sediment trap.

Chemical Stabilizers

Chemical stabilizers, also known as soil binders or soil palliatives, provide temporary soil stabilization. Various products are sprayed onto the surface of exposed soils to hold the soil in place and minimize erosion from runoff and wind. These materials are easily applied to the surface of the soil, can stabilize areas where vegetation cannot be established, and provide immediate protection.

Use chemical stabilizers alone in areas where other methods of stabilization are not effective because of environmental constraints, or use them in combination with vegetative or perimeter practices to enhance erosion and sediment control.

Closely follow the manufacturer's recommended application procedures to prevent the products from pooling and creating impervious areas where stormwater cannot infiltrate.

Inspect chemically stabilized areas regularly for signs of erosion, and if necessary, reapply the stabilizer.

Retrieved from "http://epg.modot.org/index.php?title=806.8_Storm_Water_Pollution_Prevention_Plan_%28SWPPP%29"
Category: 806 Pollution, Erosion and Sediment Control

- This page was last modified on 7 December 2016, at 12:27.



Missouri
Department of Transportation
888-ASK MoDOT (275-6636)



[About Us](#) | [Travelers](#) | [Business](#) | [Bidding](#) | [Plans & Projects](#) | [Other Transportation](#) | [News & Information](#) | [Programs & Services](#) | [Safety](#) | [Careers](#)

HOME >> BUSINESS >> CONTRACTOR RESOURCES >> **LAND DISTURBANCE ITEMS**

Land Disturbance

MoDOT Stormwater Database

Land Disturbance Items

Storm Water Pollution Prevention Plan (SWPPP) August 2014
EPG – SWPP
Land Disturbance Permit
Land Disturbance Inspection Form
DNR Permit Sign
Land Disturbance Workshop 2014

Land Disturbance Resources

EPA – SWPPP Guidance
EPA – Construction BMP Guidance
EPA – Stormwater Management
EPA – Stormwater Publications
Missouri DNR – Construction Stormwater

Consent Decree Items

Final Consent Decree
Inspection Protocol
2015 Annual Compliance Report



Announcement: 2017 Recertification Training for Individuals Trained in 2015

Invitations will be sent via email for the upcoming 2017 Consent Decree Recertification Training for those trained in 2015. The trainings will be conducted by video conference format once a month starting in January 2017 and ending April 2017. Trainings will be conducted on:

January 31, February 14, March 16, and April 11.

Individuals will only need to attend one session. Training will be required to maintain your status as WPCM, Erosion Control Inspector, or Stormwater Resident Engineer. This training will not replace the introductory training, invitations should not be forwarded. If you attended training in 2015 and do not receive an invitation by January 2, 2017, please email Brian.K.Williams@modot.mo.gov.

The documents are provided in Acrobat Reader format. [Free Acrobat Reader download](#) 

About Us

[Who We Are](#)
[Annual Reports](#)
[Our Mission, Values and Tangible Results](#)
[Missouri Highways and Transportation Commission](#)
[Career Opportunities](#)

How Do I...

[Adopt a section of highway](#)
[View construction projects](#)
[Request a highway map](#)
[Report a road concern](#)

Contact Us

Missouri Department of Transportation
Central Office
105 W. Capitol Avenue
Jefferson City, MO 65102
1-888-ASK-MODOT (275-6636)
1-866-831-6277 (Motor Carrier Services)
Driver's License Offices

Bookmark This Page!

[Missouri License Plates - Renew Online](#) | [Missouri State Government](#) | [Missouri Amber Alert](#) | [Missouri Homeland Security](#)

102.2 Contractor Performance Rating System

From Engineering Policy Guide

Contents

- 1
- 2 102.2.1 Evaluation
- 3 102.2.2 Evaluation Categories
- 4 102.2.3 Evaluation Completion
- 5 102.2.4 Evaluation Determination
- 6 102.2.5 Contractor Recognition
- 7 102.2.6 Contractor Discipline
- 8 102.2.7 Performance Discussion

Forms

Contractor Performance Evaluation Example
Form for 2014

Contractor Performance Evaluation System
(<http://p0004/ContractorRating/displayLogin.do>)

The Missouri Code of State Regulations (<http://www.sos.mo.gov/adrules/csr/current/7csr/7c10-10.pdf>) governs the Contractor Performance Rating System. While this system is not mentioned in the specifications, changes in specifications and areas of emphasis warrant periodic changes to the evaluation process and the administrative rules are routinely changed to improve the system.

The Construction and Materials Division is charged with tracking contractor performance. The Commission is informed of contractors being recognized for outstanding performance as well as those being disciplined for less than satisfactory performance after the State Construction and Materials Engineer completes reviews and the Chief Engineer gives approval.

The project performance evaluation is provided at the project preconstruction conference and at the start of each year. Project performance measurements are known at the beginning of each evaluation period.

102.2.1 Evaluation

The reporting period for the annual performance project evaluation is the calendar year, January 1 through December 31 with the report for each active project due on February 1 of the following year. Final reports on projects completed during the calendar year are due 30 days after project acceptance.

An Interim Report is completed on all contractors with a disciplinary status and may also be completed at any time, at the discretion of the engineer, for any contractor when a serious concern regarding contractor performance on the project exists. Interim reports are performed at mid-season; either when the work on the project for the year is approximately fifty percent (50%) completed or by September 1, whichever comes first. The interim report provides the contractor an opportunity to improve their ratings before the end of year annual evaluation. The interim report is for informational purposes only.

102.2.2 Evaluation Categories

The evaluation is divided into sections corresponding to the Missouri Standard Specifications for Highway Construction. Point values are assigned to each question and each question is assigned to one of four categories:

Quality, Prosecution and Progress, Contract Compliance, and Contract Administration.

Contract Compliance is further divided into 3 subcategories:

- contract requirements,
- erosion control, and
- traffic control.

102.2.3 Evaluation Completion

The project inspection staff is responsible for completing the individual project performance evaluation and, after a review by the resident engineer, it is provided to the contractor for review and comment.

When completing an evaluation, every question begins with a 100% compliant response. Documentation is required to reduce any response rating. Stepped communications for infractions are encouraged. Minor infractions should be initially verbally communicated (no effect on ratings). If the infraction continues, documentation should begin (rating is effected). Order Records (Notices of Violations) create negative point assessments for "Contract Compliance". Letters or documentation records do not, but provides a basis for reducing the contractor's performance evaluation.

102.2.4 Evaluation Determination

Contractors receive individual project evaluations in each of the four categories and an Overall annual rating. Category performance ratings are determined by dividing the total point values of applicable questions answered by the total possible category point value. Questions included in the evaluation are contract requirements. Routine project records and documentation support the responses. Not all questions included in the evaluation are applicable on a project.

The project Quality rating is weighted by the dollar value of work completed during the rated construction season for each section of the evaluation. (Example: if bridge items comprise 75% of the completed work performed on a project, then 75% of the project Quality of Work rating will be obtained from the Section 700 questions). The effect of subcontractors' work on the prime contractor's rating can be determined.

The category of Prosecution and Progress is evaluated based on the dollar value of the contract. Some considerations in determining the contractor's rating are: status of project progress, project scheduling, subcontractor / supplier coordination, adequacy of equipment, adequacy of work force, and project supervision.

To keep from penalizing contractors for delays beyond their control, adjustments in the contract completion must be made as allowed by Sec 108 (http://www.modot.org/business/standards_and_specs/SpecbookEPG.pdf#page=4) (see appropriate subsections Secs 108.6, 108.7.1, 108.7.2, 108.8 or 108.14). It will be necessary to change order justifiable time extensions for additional authorized work, utility or other excusable or noncompensable delays affecting the contractor's schedule.

Complete change orders to adjust project completions prior to submitting the evaluation to the contractor to minimize disputes. The review period for the evaluation is tight and it is not to the advantage of the state nor the contractor to utilize the review period for challenging contract delays.



The Contract Compliance rating is based on dollar value of work completed during the rated year. The subcategories of the category are: traffic control, erosion control and contract provision requirements.

The Contract Administration category evaluation is also based on the dollar value of the contract. The category rates required documentation submittals for the project, such as: list of suppliers, subcontract requests, payrolls, trainee reports, material invoices / certifications and final project documentation.

The project Overall rating is the average of the categories rated.

The contractor's annual performance summary is the weighted average of the individual project's overall and category ratings, i.e., \$10 M of completed work on one project will carry twice the weight of \$5 M of completed work on a second project.

Statistical analysis is used to identify the system's performance levels:

- Outstanding
- Above Average
- Average
- Below Average
- Unacceptable

The mean (average) and standard deviation of all ratings are calculated for each of the categories and overall ratings. Ratings falling below the mean minus two standard deviations define unacceptable performance. Ratings between the mean minus one and two standard deviations establishes below average performance. Rating values between the mean plus and minus one standard deviation identifies average performance. Ratings between the mean plus one and two standard deviations signifies above average performance. Outstanding performance is recognized as having a rating above the mean plus two standard deviations.

102.2.5 Contractor Recognition

For purposes of performance recognition, contractors are divided into 4 groups.

Specialty Contractors are defined as contractors performing 85% of their total work in a single work element. Specialty contractors typically complete 2 to 4% of the total dollar volume.

Heavy Volume Contractors are the top ten contractors who complete the largest volume of work and typically complete 45 to 50% of the total dollar volume.

Medium Volume Contractors are the top 1/2 remaining contractors and typically complete 45 to 50% of total dollar volume.

Low Volume Contractors are the remaining contractors. They typically complete 3 to 5% of total dollar volume.

Contractors eligible for recognition must complete greater than 2% of Low Volume Contractor group total dollar volume and have an overall rating of above average. Group Overall Top Achievers are recognized by a plaque displayed in MoDOT's Central Office Lobby and with a plaque presented at Annual MoDOT / Associated General Contractor (AGC) Meeting routinely held each fall. Group "Category" Top Achievers receive a certificate of recognition at the annual MoDOT/AGC COOP meeting.

102.2.6 Contractor Discipline

Disciplinary action results from unacceptable ratings in the categories:

- Quality
- Prosecution & Progress
- Contract Compliance
- Overall

An unacceptable Contract Administration rating will not by itself bring disciplinary actions unless the category rating results in an unacceptable Overall rating.

The system is designed to encourage communication on the project and provide information to the contractor to help identify operational areas where greatest improvement can be realized. Continued unacceptable performance imposes progressive disciplinary actions. Disciplinary actions may extend to affiliates of the contractor.

An initial unacceptable performance rating will place the contractor on probation.

After a second unacceptable performance rating the contractor will be declared nonresponsible and suspended from bidding any additional work for a period of one year. At the conclusion of the suspension period, the contractor will be permitted to bid on department projects on a probationary status.

A third subsequent unacceptable rating will disqualify a contractor from bidding for a period of three years.

A contractor will be declared nonresponsible and will be prohibited from bidding for a period a three years if the company is in probationary status after return from a previous suspended or disbarred status. After the three year debarment, the contractor will be allowed to bid work on a renewed probationary status.

Contractors with a disciplinary status can return to good standing after achieving average annual summary ratings.

102.2.7 Performance Discussion

The resident engineer must discuss performance with the contractor. If performance deficiencies exist, the contractor needs the time during the remainder of the season to provide the opportunity to improve their ratings for the year. The department does not want a contractor disciplined at the end of a construction season without assurances efforts were made to timely communicate any poor performance. It is not MoDOT's intent or desire to disqualify contractors but it must insist on quality construction and timely completion of projects.

Retrieved from "http://epg.modot.org/index.php?title=102.2_Contractor_Performance_Rating_System"
Category: 102 Bidding Requirements and Conditions

- This page was last modified on 8 June 2016, at 13:18.

748.1 Evaluation of Project Impacts

From Engineering Policy Guide

Contents

- 1 748.1.1 Evaluation of Risk
 - 1.1 748.1.1.1 Risk Assessment
 - 1.2 748.1.1.2 Risk Analysis
- 2 748.1.2 Hydrologic Impacts of Roadway
- 3 748.1.3 Hydraulic Impacts of Bridges and Drainage Structures
- 4 748.1.4 Common Drainage Complaints



748.1.1 Evaluation of Risk

The design of all hydraulic structures should include an evaluation of the potential for hydrologic and hydraulic impacts to the roadway and surrounding properties. The evaluation of risk is a two-stage process:

748.1.1.1 Risk Assessment

The initial step, identified as risk assessment, is a qualitative analysis of the potential risk involved with the drainage structure. This evaluation should include particular attention to the following risks:

- lack of a practicable detour
- hazard to people
- hazard to surrounding property

748.1.1.2 Risk Analysis

If the evaluation of potential hydrologic or hydraulic impacts indicates a potential exists for "unreasonable" damage to occur, a risk analysis should be performed. The risk analysis will consider damage to the roadway structures and embankments, damage to surrounding properties and traffic related losses, and will determine an appropriate balance between increasing the cost of the project and decreasing the risk of hydraulic impacts. Procedures for conducting a risk analysis are included in the FHWA HEC-17 publication Design of Encroachments on Floodplains Using Risk Analysis. Contact GHQ Design for additional guidance in performing a risk analysis. The evaluation of potential hydrologic and hydraulic impacts, as well as the risk analysis, if one is performed, shall be retained with the project file.

748.1.2 Hydrologic Impacts of Roadway

Development such as a highway project can affect the hydrologic characteristics of a watershed. Such development typically increases the amount of impervious area within the watershed, and may also decrease the time of concentration of the watershed. Both of these effects tend to increase both the volume and peak rate of runoff from the watershed. The magnitude of this increase is generally dependent on the ratio of the developed area (pavement and right of way in the case of highway projects) to the total watershed drainage area. When the developed area is a large percentage of the total drainage area, the impacts can be significant. The degree of hydrologic impact shall be subjectively evaluated for all highway projects; when the impacts are estimated to be of concern, a detailed analysis shall be performed. Significant increases in peak flow rates shall be mitigated through the use of detention storage or other appropriate measures.

748.1.3 Hydraulic Impacts of Bridges and Drainage Structures

For each drainage structure, an evaluation should be performed to compare the general hydraulic conditions of the area before and after the proposed improvement is made. This evaluation should consider increases in peak flow rates, flow velocities and water surface elevations as well as changes in drainage patterns before and after the proposed improvement is made. With the results of this evaluation, a determination can be made concerning the flood damage potential to adjacent properties as a result of the proposed improvement.

Evaluation of the consequences of risk associated with a stream crossing considers capital cost, traffic service, environmental and property impacts and hazards to human life. The risk assessment should consider damage to structures, embankments, and surrounding property, traffic related losses, and scour or stream channel change.

748.1.4 Common Drainage Complaints

Listed below are several common causes for drainage complaints by landowners. Consideration should be given to minimizing or eliminating, to the extent practical, these causes for complaint:

- Diversion of flow from one watercourse to another
- Collection and concentration of surface waters
- Augmentation of flow peaks or volumes
- Obstruction of flows resulting in increased backwater
- Erosion and sedimentation
- Groundwater interference

Retrieved from "http://epg.modot.mo.gov/index.php?title=748.1_Evaluation_of_Project_Impacts"

Category: 748 Hydraulics and Drainage

- This page was last modified on 5 May 2008, at 10:12.

Category:171 Maintenance Policy and Operations

From Engineering Policy Guide

This article links to other Engineering Policy Guide (EPG) articles to access current policies. The EPG is a combination of former manuals from Right of Way, Design, Bridge, Construction and Materials, Traffic and Maintenance and is the single reference for all engineering guidance.

Related Information

Definitions of shall, may, will and should

The EPG replaces the old Maintenance Policy Manual and is to be used by maintenance and other MoDOT personnel to execute daily

departmental assignments and deal with external customers.

Direct any questions concerning specific EPG guidance to the division providing the guidance. For example, Maintenance is primarily responsible for guidance about pavement repairs, mowing, litter control and other Maintenance activities. MoDOT employees that are unclear as to which division to contact may send an email to "Engineering Policy". The Engineering Policy Group maintains the EPG and assists divisions in developing new policy and revising existing policy.

This article also presents the history of these Maintenance policies.



Safety Videos

Mowing Safety

(http://epg.modot.mo.gov/documents/132_Mowing_Safety.wmv)

Asphalt Operations

Safety is My Story (<http://www.youtube.com/user/modotvideo>)

Additional Information

Heat Safety (<http://wwwi/intranet/ri/documents/06-2012.pdf>)

Hand Protection

Hearing Protection

Where to Find Maintenance Policy Manual Information in the EPG

Article Policy No. Policy Title

Administration

- ADM(A1) Maintenance Division's Role
- ADM(A2) Policy Amendments
- ADM(A3) Maintenance of Park Roads
- ADM(A4) Construction by Maintenance Forces
- ADM(A5) Safety in Maintenance Operations
- ADM(A6) Private Property Damage
- ADM(A7) Private Property Damage Numbers

Agreements

- ADM(B1) Maintenance Responsibilities in Cities
- ADM(B2) Contracts for Maintenance on City Streets

Division Guidelines

- ADM(C1) Bulletin Boards
- ADM(C2) Maintenance Contracts
- ADM(C3) Functional Maintenance

ADM(C4) Roadway Features Inventory

Operations

ADM(D1) Cold Weather Operations

ADM(D2) Reimbursement for Meals

ADM(D3) Advanced Right of Way Purchase

ADM(D4) Disaster Preparedness

ADM(D5) Tarping Loads

ADM(D6) Weight / Over Dimension Compliance

ADM(D7) Highway Incident Reporting

Building and Grounds

Buildings

B&G(A1) Annual Building Inspection

B&G(A2) Unauthorized Use of State Property

B&G(A3) Membership in Fire Protection Districts

B&G(A4) Building Appearance

B&G(A5) Flammable Material Storage Building

Grounds

B&G(B1) Well Drilling

B&G(B2) ADA Parking

Equipment

B&G(C1) Propane Tank Requirements

B&G(C2) Fuel Pump Calibration

Highway Patrol

B&G(D1) Fuel

B&G(D2) Weigh Station Obligations

B&G(D3) Portable Scale Turnouts

B&G(D4) Highway Patrol Zone Offices

Roadway Maintenance

RDW(A1) Temporary Pavement Marking

RDW(A2) Longitudinal Crack Pouring / Sealing

RDW(A3) Railroad Crossing

RDW(A4) Roadway Width

Bituminous

RDW(B1) Contract Level Course

RDW(B1) Maintenance Level Course Program

RDW(B1) Cutback Asphalt

Concrete

RDW(C1) Concrete Replacement

RDW(C2) Calibrated Ready Mix Plants

Shoulders and Approaches

S&A(A1) Additional Median Crossovers

S&A(A2) Sidewalks

Approaches

S&A(B1) Public and Private Road Approaches

S&A(B2) Driveway Entrance Maintenance Limit

S&A(B3) Access Control

Shoulders

S&A(C1) Edge Ruts

- S&A(C2) Culvert Ends
- S&A(C3) Rural Mailboxes

Drainage

Pipe/Water Flow

- DRN(A1) Polyethylene Pipe Liner
- DRN(A2) Change in Water Inflow and Outflow
- DRN(A3) Drainage Pipe Replacement
- DRN(A4) Plastic Pipe

Levees

- DRN(B1) Levee Attachments
- DRN(B2) Levee Fees and Taxes

Water Management

- DRN(C1) Industrial and Domestic Waste Waters on ROW
- DRN(C2) 404 Permits
- DRN(C3) Storm Water Regulation
- DRN(C4) System Attachments by Others
- DRN(C5) Easements
- DRN(C6) Watershed Diversion

Grates and Gates

- DRN(D1) Bicycle Grates
- DRN(D2) Cattle Pass
- DRN(D3) Flood Gates

Roadsides

- RDS(A1) Commuter Parking Lots
- RDS(A2) Roadside Maintenance Activities by Others
- RDS(A3) Wetland Mitigation Areas
- RDS(A4) Heritage Database Information (HDI)
- RDS(A5) Underground Utilities

Programs

- RDS(B1) Adopt-A-Highway
- RDS(B2) Deer Kill Reports
- RDS(B3) Growing Together Program
- RDS(B4) Incarcerated Personnel

Rest Areas and Roadside Parks

- RDS(C1) Dispensing Free Refreshments
- RDS(C2) Rest Area Drinking Water
- RDS(C3) Rest Area Sewage Control
- RDS(C4) Roadside Park Requirements
- RDS(C5) Vending

Structures

- RDS(D1) Encroachments of Right of Way
- RDS(D2) Monuments

Vegetation Management

- RDS(E1) Billboard Visibility
- RDS(E2) Crops on Right of Way
- RDS(E3) Hay Harvesting on Right of Way
- RDS(E4) Herbicides

RDS(E5)	Mowing
RDS(E6)	Noxious Weed Control
RDS(E7)	Plant Collection from Right of Way
RDS(E8)	Roadside Burning

Article Policy No. Policy Title

RDS(E9)	Tree Removal
RDS(E10)	Clear Zone
RDS(E11)	National Forest Lands

Bridge Maintenance

BRG(A1)	Utility Attachments to Bridges
BRG(A2)	Levees
BRG(A3)	High Water Marks
BRG(A4)	Navigation Lights and Light Tenders
BRG(A5)	Corps of Engineers Regulations
BRG(A6)	Cathodic Protection
BRG(A7)	Work On or Over Railroad Right of Way

Bridge Maintenance

BRG(B1)	Bridge Inspections (Span Type and Culvert Type)
BRG(B2)	Bridge Maintenance (District)
BRG(B3)	Bridge Maintenance (Division)

Restrictions

BRG(C1)	Posted Bridge Load Limits
BRG(C2)	Vertical Clearance
BRG(C3)	Temporary Clearances or Restrictions
BRG(C4)	Permits (Overdimension/Overweight)

Snow and Ice Control

SIC(A1)	Anti-Icing
SIC(A2)	Operational Closure
SIC(A3)	Intent
SIC(A4)	Winter Operations Communication Plan

Materials

SIC(B1)	Liquid Chemical
SIC(B2)	Storage
SIC(B3)	Dry Salt Supply
SIC(B4)	Salt Re-orders
SIC(B5)	Large Storage Facilities
SIC(B6)	Abrasives
SIC(B7)	Liquidated Damages
SIC(B8)	Pre-wetting

Equipment

SIC(C1)	Slow Moving Vehicle Sign
SIC(C2)	Plow Width Delineator
SIC(C3)	Truck Lighting
SIC(C4)	Cleaning Equipment
SIC(C5)	Calibration
SIC(C6)	Rented Equipment Lighting

Articles in "171 Maintenance Policy and Operations"

The following 12 pages are in this category, out of 12 total.

Personnel

SIC(D1)	Personnel from other Divisions
SIC(D2)	Training
SIC(D3)	Emergency Equipment Operators
SIC(D4)	Working Hours
SIC(D5)	Shifts
SIC(D6)	On Call
SIC(D7)	Reimbursement for Meals

Operations

SIC(E1)	Order of Work
SIC(E2)	Mailboxes
SIC(E3)	Limits of Work
SIC(E4)	Emergencies Off Right of Way
SIC(E5)	Safety Precautions
SIC(E6)	Statewide Winter Road Condition Report
SIC(E7)	Abandoned Vehicle
SIC(E8)	Winter Event Database

Environmental

Solid Waste

ENV(A1)	Asbestos
ENV(A2)	Solid Waste
ENV(A3)	Tire Management
ENV(A4)	Street Sweepings
ENV(A5)	Antifreeze
ENV(A6)	Battery Management
ENV(A7)	Disposal of Animal Carcasses

Hazardous Material Spills

ENV(B1)	Hazardous Material Spills (Roadway) by Others
ENV(B2)	MoDOT Hazardous Material Spills

Rest Areas

ENV(C1)	Rest Area Lagoon
ENV(C2)	Rest Area Drinking Water

Water Management

ENV(D1)	Storm Water Regulations
ENV(D2)	Maintenance Operations in Streams
ENV(D3)	Well Closures

Containers

ENV(E1)	Fuel Storage Tanks
ENV(E2)	Herbicide Containers
ENV(E3)	Empty Drums and Containers

Environmental Compliance

ENV(F1)	Threatened or Endangered Species
ENV(F2)	Tier II Reporting

Hazardous Waste

ENV(G1)	Hazardous Waste Compliance
ENV(G2)	Lead Based Paint Abatement

ENV(G3) Equipment Cleaning Solvents

ENV(G4) Used Oil

ENV(G5) Hazardous Waste Reporting

General

ENV(H1) Open Burning

ENV(H2) Lead Mining Chat

ENV(H3) Sewage Disposal System

ENV(H4) Vehicle Placarding

ENV(H5) Fugitive Dust

ENV(H6) Vehicle Painting

ENV(H7) Environmental Site Assessment

ENV(H8) Salt Runoff

Traffic Control

TRC(A1) Adopt MUTCD

TRC(A2) Maintain Traffic Control for Field Operations

TRC(A3) Quality Standards for Temporary Traffic Control Devices

Roadside Appurtenances

RAP(A1) Crashworthy End treatments

RAP(A3) Signpost Breakaway Features

RAP(A4) Culvert Ends

Protective Barrier

RAP(B1) Guardrail

RAP(B2) Guard Cable

RAP(B3) Fixed Impact Attenuators

RAP(B4) Concrete Median Barriers

1

- 171.1 Administration
- 171.2 Buildings and Grounds
- 171.3 Roadway Maintenance
- 171.4 Shoulders and Approaches

1 cont.

- 171.5 Drainage
- 171.6 Roadsides
- 171.7 Bridge Maintenance
- 171.8 Snow and Ice Control
- 171.9 Environmental

1 cont.

- 171.10 Traffic Control
- 171.11 Roadside Appurtenances
- 171.12 Maintenance Policy History

Retrieved from "http://epg.modot.org/index.php?title=Category:171_Maintenance_Policy_and_Operations"

- This page was last modified on 31 May 2016, at 15:20.

171.6 Roadsides

From Engineering Policy Guide

Contents

- 1 RDS(A1) Commuter Parking Lots
- 2 RDS(A2) Roadside Maintenance Activities by Others
- 3 RDS(A3) Wetland Mitigation Areas
- 4 RDS(A4) Heritage Database Information (HDI)
- 5 RDS(A5) Underground Utilities
- 6 171.6.1 Programs
 - 6.1 RDS(B1) Adopt-A-Highway
 - 6.2 RDS(B2) Deer Kill Reports
 - 6.3 RDS(B3) Growing Together Program
 - 6.4 RDS(B4) Incarcerated Personnel
- 7 171.6.2 Rest Areas and Roadside Parks
 - 7.1 RDS(C1) Dispensing Free Refreshments
 - 7.2 RDS(C2) Rest Area Drinking Water
 - 7.3 RDS(C3) Rest Area Sewage Control
 - 7.4 RDS(C4) Roadside Park Requirements
 - 7.5 RDS(C5) Vending
- 8 171.6.3 Structures
 - 8.1 RDS(D1) Right of Way Encroachments
 - 8.2 RDS(D2) Monuments
- 9 171.6.4 Vegetation Management
 - 9.1 RDS(E1) Billboard Visibility
 - 9.2 RDS(E2) Crops on Right of Way
 - 9.3 RDS(E3) Hay Harvesting on Right of Way
 - 9.4 RDS(E4) Herbicides
 - 9.5 RDS(E5) Mowing
 - 9.6 RDS(E6) Noxious Weed Control
 - 9.7 RDS(E7) Plant Collection from Right of Way
 - 9.8 RDS(E8) Roadside Burning
 - 9.9 RDS(E9) Tree Removal
 - 9.10 RDS(E10) Clear Zone
 - 9.11 RDS(E11) National Forest Lands

RDS(A1) Commuter Parking Lots

Refer to EPG 644 Weigh Stations, Rest Areas, Welcome/Information Centers and Commuter Parking Lots for information regarding the design, construction, and maintenance of commuter lots.

RDS(A2) Roadside Maintenance Activities by Others

There are three methods by which non-MoDOT personnel may perform roadside activities on the right of way or on Commission property: by permit, through the Adopt-A-Highway Program and through the Growing Together Program. All of these methods require an agreement between MoDOT and the outside party.

Neighbors should be allowed to mow (without regard to height) the right of way in front of their property if they feel it will enhance the appearance of their property. Refer to EPG 822 Roadside Vegetation Management.

RDS(A3) Wetland Mitigation Areas

To ensure compliance with state and federal executive orders requiring no net loss of wetlands, MoDOT is responsible for compensating unavoidable wetland impacts through wetland restoration, creation or enhancement. Signs stating "Mitigation Area - Do Not Disturb" are used to identify the boundaries of the mitigation area to protect against disturbance. Refer to EPG 127.16.1.4 Maintenance concerning maintenance of wetland mitigation areas.

RDS(A4) Heritage Database Information (HDI)

Refer to EPG 127.27 Guidelines for Obtaining Environmental Clearance for Project Specific Locations.

RDS(A5) Underground Utilities

Utility companies with underground utilities on highway right of way shall be informed when work is planned that will cause a substantial change in grade at the location of the utility. This may involve work such as major slide repair, major slope grading or drainage channel clean out or realignment. (Although One Call should be notified, this action alone does not ensure all utilities will be notified).

171.6.1 Programs

RDS(B1) Adopt-A-Highway

MoDOT establishes and maintains an ongoing cooperative program that encourages individuals, groups and organizations to become involved in litter pickup, mowing and/or beautification of roadside areas. Refer to EPG 824 Adopt-A-Highway and Sponsor-A-Highway Programs for additional information and guidance.

See 7 CSR 10-14.010 - 14.050, Adopt-A-Highway Program (<http://www.sos.mo.gov/adrules/csr/current/7csr/7c10-14.pdf>) . Refer to EPG 141.8 Sponsorship Programs for more information on MoDOT's Sponsorship Policy.

RDS(B2) Deer Kill Reports

Each road killed deer encountered is to be recorded on the Deer Death Report at the district office. This monthly report is sent to the Central Office and the monthly total reported to the Missouri Department of Conservation.

RDS(B3) Growing Together Program

MoDOT cooperates with state and local government groups as well as private groups interested in developing extensive plantings on right of way designed to enhance the appearance of state highways and neighboring communities. Contact the Roadside Section (<http://sharepoint/systemdelivery/MT/SitePages/Roadsides.aspx>) in the Central Office for assistance. Refer to EPG 141.8 Sponsorship Programs for more information on MoDOT's Sponsorship Policy.



RDS(B4) Incarcerated Personnel

Incarcerated personnel are used to improve the roadside environment by undertaking work that is above and beyond normal highway beautification efforts. The intent is to accomplish labor intensive projects not normally accomplished by routine maintenance crews or construction contracts. Refer to EPG 823 Incarcerated Personnel Work Release Program for information.

171.6.2 Rest Areas and Roadside Parks

RDS(C1) Dispensing Free Refreshments

Groups and organizations are permitted to use rest areas and roadside parks to dispense coffee and other nonalcoholic refreshments for the sole purpose of encouraging motorists to take safety breaks during a holiday trip.

All activities must be confined within the rest area or park boundary and away from drives and ramps used for the movement of vehicles. Signing for this activity is provided by MoDOT and organization signs are limited to a small identification sign at the table or vehicle used to dispense refreshments.

Refreshments offered to the traveling public must be free. Donations and contributions for any cause shall not be permitted.

RDS(C2) Rest Area Drinking Water

Refer to EPG 127.25.3.2 Rest Area Drinking Water concerning information about rest area drinking waters.

RDS(C3) Rest Area Sewage Control

Refer to EPG 127.25.3.1 Rest Area Lagoon concerning information about rest area lagoons.

RDS(C4) Roadside Park Requirements

State highway right of way cannot be used for roadside park purposes. Roadside parks are not planned as local parks or overnight camping areas and are not built with toilets, water or electrical supply.

All roadside parks must be approved by the Commission.

RDS(C5) Vending

No vending is allowed in rest areas or on state highway right of way except for vending machines installed by agreement or permit. By law, the Department of Social Services, Division of Family Services, Rehabilitation Services for the Blind has been granted authority to govern and regulate vending in rest areas. When such authority is declined, MoDOT shall develop an agreement or issue a permit with another appropriate agency, organization or association to govern and regulate the vending.

If the Department of Social Services, Division of Family Services, Rehabilitation Services for the Blind elects to assume the authority granted by law to govern and regulate vending assigned to another agency, organization or association, the existing agreements or permits shall be terminated.

MoDOT reserves the right to remove any vending machine from a rest area at vendors cost, if the machine is installed or maintained in violation of established agreements.

171.6.3 Structures

RDS(D1) Right of Way Encroachments

State law allows the commission to prohibit encroachments on state right of way. Right of way encroachment is defined as the placement and/or maintenance of unauthorized items, or the performance of unauthorized activities, on or extending over onto state right of way. Unauthorized items and activities include but are not limited to:

Items	Activities
Signs (political, garage sale, etc.)	Vehicle parking in restricted areas
Display materials (streamers, balloons, banners)	Vending
Trash containers	Excavation

All encroachments that pose a safety hazard to MoDOT personnel or the traveling public shall be addressed immediately. If the encroachment posing a safety hazard is an unauthorized item or activity and can be removed, it shall be removed immediately.

Unauthorized encroachment items removed from the right of way should be stored at the nearest maintenance facility; unclaimed items may be properly disposed after 30 days.

For permanent encroachments involving construction on the right of way, a written notice shall be sent to the owner by the district engineer. If the encroachment is not removed in a timely manner, a “Notice to Remove Encroachment,” including a deadline for removal shall be sent to the owner by the district engineer. If the encroachment is not removed by the specified deadline, the district engineer shall refer the matter to the Chief Counsel’s Office (<http://sharepoint/support/cc/Pages/default.aspx>) for legal action. Sample encroachment notice letters and encroachment removal letters are available from the State Maintenance Engineer.

Permanent encroachments where the owner cannot be identified shall be removed as soon as possible.

Encroachments that do not pose an immediate safety hazard to MoDOT personnel or the traveling public shall be removed prior to beginning a maintenance activity on the route. However, encroachments may be removed more frequently at the discretion of the Area Engineer (http://www.modot.org/bolderfiveyearadirection/documents/FINAL_AEonepagesummary.pdf) . Encroachment removals can be coordinated with litter pickup and other maintenance work such as mowing, edge-rut repairs, crack sealing, etc.

Single-use items generally made of paper and cardboard can be disposed of immediately without notice. Professionally made or reusable items should be stored at the nearest maintenance facility; unclaimed items may be properly disposed after 30 days.

Any holiday decorations placed on or across the state right of way must have a permit signed by personnel designated by the district engineer.

All actions regarding encroachments should be timely and fair.

Notice of Encroachment RDS(D1)A (http://sharepoint/systemdelivery/MT/roadsides/_layouts/WordViewer.aspx?id=/systemdelivery/MT/roadsides/Shared%20Documents/Encroachments/Notice%20of%20Encroachment.docx&Source=http%3A%2F%2Fsharepoint%2Fsystemdelivery%2F

Removal Notice RDS(D1)B (http://sharepoint/systemdelivery/MT/roadsides/_layouts/WordViewer.aspx?id=/systemdelivery/MT/roadsides/Shared%20Documents/Encroachments/Notice%20To%20Remove%20Encroachment.docx&Source=http%3A%2F%2Fsharepoint%2Fsyst

Unauthorized Items off Roadsides Flier

RDS(D2) Monuments

MoDOT permits approved organizations (State Historical Society of Missouri, Federated Garden Clubs of Missouri and the Daughter's of the American Revolution) to place markers at approved locations along highways within the bounds of rest areas, roadside parks or turnouts. These markers are located for the purpose of honoring service men and women who served in a particular war or to designate points of historical interest.

Placement of markers and tablets requires Commission approval.

Additional information is available from the Roadside Section (<http://sharepoint/systemdelivery/MT/SitePages/Roadsides.aspx>) in the Central Office.

171.6.4 Vegetation Management

RDS(E1) Billboard Visibility

Refer to EPG 236.16.8 Vegetation Removal concerning the management of vegetation around billboards.

RDS(E2) Crops on Right of Way

Refer to EPG 822.7 Hay and Other Crops on the Right of Way.

RDS(E3) Hay Harvesting on Right of Way

Refer to EPG 822.7 Hay and Other Crops on the Right of Way.

RDS(E4) Herbicides

Refer to EPG 821 Herbicides and Roadsides.

RDS(E5) Mowing

Refer to EPG 822 Roadside Vegetation Management.

RDS(E6) Noxious Weed Control

Refer to EPG 821.18 Noxious Weeds.

RDS(E7) Plant Collection from Right of Way

No person shall dig or remove any plants or plant parts from any real property of the Commission or the right of way of any state highway or roadway without permission. Special permits covering the collection of plants and plant parts from highway right of way may be issued by MoDOT. Provided that such plants or plant parts are not offered for sale, the collection of seeds, fruits, nuts, berries, edible wild greens or flowering parts of plants, or the occasional collection of plants for the purposes of scientific research or education may be permitted.

Under special circumstances, MoDOT can write a permit, to collect and sell plants or plant parts from right of way. Contact the Roadside Section (<http://sharepoint/systemdelivery/MT/SitePages/Roadsides.aspx>) for information.

RDS(E8) Roadside Burning

Refer to EPG 127.25.8.1 Open Burning for information pertaining to the open burning of materials on MHTC property.

RDS(E9) Tree Removal

Trees located on Missouri Highways and Transportation Commission (MHTC) property are considered state property. Trees on MHTC property that are dead, diseased, deformed or storm damaged, have the potential to create a safety hazard to MHTC personnel as well as the traveling public. Efforts should be made to minimize the potential hazard.

Utility companies should be contacted prior to removing trees under or near utility lines, for possible assistance or removal by their crews. Commercial arborists may be obtained on an agreed price basis for removal of large trees especially where there is a possibility of damage to private property.

Tree trunks and tree limbs may be cut up by department personnel and hauled back to the maintenance building for use as firewood at the maintenance building, or stockpiled at the maintenance site, and ultimately sold per General Services policies concerning the disposal of surplus property. A copy of the "GS22 Bill of Sale – Generic" (http://sharepoint/support/CC/CCO%20Contracts/GS_-_General_Services/Bills_of_Sale/GS22_Bill_of_Sale-_Generic.docx) for the tree trunks and tree limbs sold as surplus property shall be maintained by MoDOT in accordance with the policies pertaining to surplus property disposal.

Tree trunks and tree limbs may be cut into manageable lengths (not less than 2 ft. long and not more than 6 ft. long) and left on the adjacent property owners property at the right of way line for use by the adjacent property owner provided the adjacent property owner has expressed a desire to use the wood. The adjacent property owner shall obtain access to the wood from their own property. The adjacent property owner shall not utilize MHTC right of way to gain access to the wood.

Root-balls associated with tree removals are not considered to be clean fill according to the Missouri Department of Natural Resources. Therefore, root-balls shall not be buried. They may be hauled off to a demolition landfill, or they may be ground up using a tub grinder.

Any burning of tree trunks, tree limbs, or root-balls on the right of way shall be done according to the EPG 127.25.8.1 Open Burning.

Tree stumps anywhere on the right of way shall be cut flush or below ground level. Treatment of tree stumps to prevent re-growth shall be in accordance with EPG 821 Herbicides and Roadsides.

Personnel engaged in the removal of dead, diseased, deformed, or storm damaged, trees shall be trained in the safe operation of chainsaws and other tree trimming devices.

Personnel must also be familiar with the applicable safety guidelines as set forth in MoDOT's Safety Policies, Rules & Regulations (<http://lnapp1/RI/RIManual.NSF/SHToC?OpenView>) .

MoDOT staff shall be in compliance with Personnel Policy # 2700 – Ethical Conduct when disposing of tree trunks and tree limbs. Also, staff should comply with the U.S. Fish and Wildlife Service concerning protection of Indiana bat tree habitat. Questions regarding Indiana bat trees should be directed to the Environmental Section (http://sharepoint/sites/de/environmental_historic_pres/SitePages/Home.aspx) of Design.

Trees associated with construction projects shall be managed according to the conditions contained in the contract documents.

RDS(E10) Clear Zone

Refer to EPG 231.2 Clear Zones for information concerning how clear zones are established and EPG 120.6.2 Trees and Brush concerning their maintenance.

RDS(E11) National Forest Lands

MoDOT shall coordinate with the Forest Service all maintenance activities which involve additional clearing, slash disposal, chemical control of vegetation, disposal of slough material, changes in road drainage patterns, materials source and storage and similar actions which involve highways through National Forest lands. The Forest Service will assist MoDOT with matters related to equipment parking, material storage, material sources, and designated slough and slide material disposal areas as well as advising the department of any activities that have an impact on highway maintenance.

Retrieved from "http://epg.modot.org/index.php?title=171.6_Roadsides"
Category: 171 Maintenance Policy and Operations

- This page was last modified on 10 June 2015, at 09:44.

Category:821 Herbicides and Roadsides

From Engineering Policy Guide

821.1 Introduction

Pesticides are in a broad category including insecticides, herbicides, algicides, miticides and several other chemicals specific to a particular target. Insecticides are chemicals used to control insects.

Herbicides are chemicals designed to control plant growth. When applied at the correct rate, proper time and method, with the proper equipment in suitable weather conditions, herbicides accomplish their manufacturer's claims. MoDOT recognizes herbicides as one of the tools used in vegetation management, the same as a lawn mower or brush hog. This is referred to as Integrated Vegetation Management or IVM. It is a practice of site evaluation and using the best resources you have available to maintain the desired vegetation management. Within IVM programs, herbicides are judiciously applied in a focused, selective manner. Herbicides are used to eliminate invasive plants proven difficult to manage by hand or mechanical maintenance methods. The word "chemical" often raises a red flag with the public. Some express great concern about applying a synthetic chemical to control a noxious weed yet we introduce a synthetic chemical into our own bodies to control diseases in the form of medications. Medicine is used to control and prevent disease; herbicides are used to control and prevent vegetation. Both can create disastrous results if not used correctly, but when used correctly, can improve the quality of life.

The purpose of this article is to ensure we use herbicides correctly along Missouri roadsides. MoDOT has guidelines for the planning and ordering of herbicides as well as their storage and inventory control.

An operator is to determine the target, select the proper herbicide, apply at the correct time, rate and method, use well-maintained equipment and protect himself or herself, other employees, the public and the environment.

Maintenance planning guidelines for chemical weed control are available.

Additional Information

The Missouri Dept. of Agriculture provides information about pest management (<http://mda.mo.gov/plants/ipm/>)

821.1.1 Labels are the best source of information

EPG 821 takes information from the manufacturer's label on each herbicide and applies it to uses on highway right of way. Operators and their supervisors must read and follow the label. The label is the law.

The rates listed in this article are recommended rates for Missouri roadsides. The product label will list a wide range of rates since the manufacturer must consider all parts of the country with a broad range of soil and seasonal



conditions. Rates listed here are what have been successfully used in Missouri with the concurrence of the manufacturer's representative.

MoDOT is very concerned about the safe use of herbicides for the operator, the public and the environment, both on and off the right of way. This is why we do not use or purchase restricted use herbicides (or RUPs, restricted use products). We encourage employees to attend training sessions offered each year by MoDOT. Employees are also encouraged to obtain and maintain a Certified Public Operators License offered each year in cooperation with MoDOT and the Department of Agriculture. This license is for the application of pesticides on the rights of way if employed and doing the work for a public agency such as MoDOT.

Safety equipment, commonly referred to as personal protection equipment (PPE), will be furnished to mix and apply herbicides. This equipment must be used when required, as stated on the label. Unnecessary use of safety equipment is discouraged due to the possibility of heat-related problems.

Protect yourself from splashes or spills during mixing. To reduce exposure to herbicides, use common sense and personal hygiene practices such as washing hands, arms and face frequently, changing clothing daily, not walking in areas treated when still wet and monitoring the wind direction and speed, wash clothing separately at home and use care when climbing on truck or sprayer because of wet surfaces. It is highly recommended to keep a separate tank of clean water on the spray truck to flush immediately if a spill occurs.

Maintenance (<http://wwwi/maintenance/>) bids herbicides annually for the entire state. When new herbicides are received, the previous year's stock is to be placed where it will be used first. This is referred to as "First In First Out" (FIFO). District maintenance is to be notified if there is an oversupply of one or more herbicides.

Several companies manufacture and sell herbicides such as 2,4-D and glyphosate under various names. Operators are to properly identify herbicides before mixing. The label is the best source of information.

821.1.2 Only herbicide combinations permitted by MoDOT are listed in this article

Operators and supervisors should know the visual effects of the herbicides used by MoDOT. Some herbicides such as 2,4-D, may have a noticeable effect within hours under certain weather conditions. Others may take days, weeks, or in the case of Krenite S, as much as nine months for the results to be visible. This article also contains guidelines for special conditions such as those for problem weeds, woody plants, aquatic areas and landscaped areas.

Record keeping is an important part of all maintenance activities including herbicide application. The operator **shall** record the date, route, weather conditions, material sprayed, target and rate of application daily. The standard spray log is included in EPG 821.8 Record Keeping. Spray logs should be kept with the unit of operation during the season and then the records kept for three years.

Successful maintenance operations depend on well-maintained equipment. Equipment will be operated by someone who receives training and knows the capabilities and limitations of that equipment. In herbicide application, it is very important that the spray equipment is clean, in good operating order and properly calibrated.

In summary, the important steps for an operator to follow are to

- determine the target
- select the proper herbicide
- apply at the correct time, rate and method, using well-maintained equipment
- and protect yourself, fellow employees, the public and the environment.

Other topics in this article include plant growth regulators, traffic control for spraying operations, how to report an herbicide spill incident and additives and adjuvants. Forms, a glossary and a listing of products has also been

included.

Articles in "821 Herbicides and Roadsides"

The following 25 pages are in this category, out of 25 total.

8

- 821.2 Safety
- 821.3 Public Relations
- 821.4 Pesticides and the Environment
- 821.5 Storage Facilities
- 821.6 Inventory Control and Storage
- 821.7 Planning and Ordering
- 821.8 Record Keeping
- 821.9 Labels and Safety Data Sheets (SDS)

8 cont.

- 821.10 Equipment and Application Methods
- 821.11 Calibration
- 821.12 Mixing and Handling Guidelines
- 821.13 Traffic Control for Spraying Operations
- 821.14 Herbicide Spills Incident Reporting
- 821.15 Forms and Conversions
- 821.16 Total Vegetation Control Treatment
- 821.17 Plant Growth Regulators (PGRs)
- 821.18 Noxious Weeds

8 cont.

- 821.19 Problem Weeds
- 821.20 Woody Plant Control
- 821.21 Aquatic Areas
- 821.22 Weed Control in Landscaped Areas
- 821.23 Additives and Adjuvants
- 821.24 Glossary
- 821.25 Products
- 821.26 Maintenance Planning Guidelines for Chemical Weed Control

Retrieved from "http://epg.modot.org/index.php?title=Category:821_Herbicides_and_Roadsides"

- This page was last modified on 23 February 2017, at 10:19.

Category:822 Roadside Vegetation Management

From Engineering Policy Guide

MoDOT's roadside management philosophy is to preserve, enhance and diversify the roadsides of Missouri's transportation system. Our roadside management program helps keep Missouri roadsides safe and attractive. This program establishes and maintains desirable roadside vegetation to control erosion.



Safety Video

Mowing Safety

(http://epg.modot.mo.gov/documents/132_Mowing_Safety.wmv)

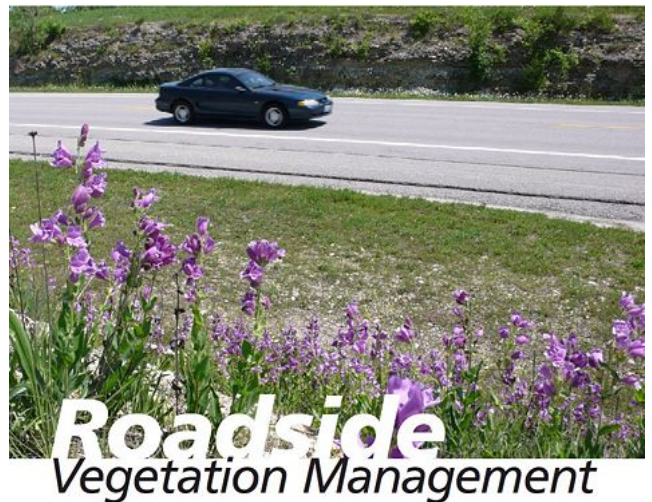
Other Information

Heat Safety (<http://wwwi.intranet/ri/documents/06-2012.pdf>)

This is accomplished through several methods including an effective herbicide program, fertilization, mowing, brush control and litter removal. Wildflower and native grass plantings, landscaping and naturalized vegetation are also part of maintaining and improving safety and

roadside appearance. Combining different management practices, such as these, form an Integrated Roadside Vegetation Management (IRVM) program.

The sharing of best practices among districts results in greater efficiency and effectiveness and helps meet the need to operate better, faster and cheaper. Money is saved on labor and mobilization by making mowing a focused priority during scheduled times. Consistency is also improved.



Roadside Vegetation Management Policy

Vegetation in sight distance areas shall be controlled as necessary on all routes.

Equipment shall not be used on slopes steeper than 1V:3H (3 to 1) unless designed for that purpose. Reliable, manufactured slope indicators shall be used on all mowing equipment.

New trees or hardscape features shall not be permitted within 30 ft. from the nearest traveled way. This distance is extended to 40 ft. on routes with 65-70 mph speed limits. Exceptions may be permitted if behind barriers or if other special circumstances exist.

Vegetation shall be removed that interferes with the visibility of MoDOT signs.

Traffic control shall be performed according to the most recent edition of EPG 616.23 Traffic Control for Field Operations.

Noxious weed control shall be done on all routes, as required by federal, state and county laws and regulations. Noxious weed control shall be by either chemical or biological means.

Vegetation management practices shall not conflict with efforts to protect state and federally designated endangered species. Refer to Heritage Database Information (http://epg.modot.mo.gov/index.php?title=171.6_Roadsides#RDS.28A4.29_Heritage_Database_Information_.28HDI.29) . Contact the Design Division's Environmental Section at (573) 751-2876 for assistance.

Required mowing on major roads shall be completed before Memorial Day and mid-July. The final mowing shall begin in mid-September.

Final mowing shall be completed by November 30.

Design Aspects of Mowing

Mowing should be specified for projects requiring significant mowing during construction. The project core team, with significant input from district Maintenance, should determine which projects will require mowing during construction. The district should include in the proposal the job special provision titled "Mowing", JSP-00-11 (https://spexternal.modot.mo.gov/sites/de/_layouts/15/WopiFrame.aspx)

sourcedoc=%2Fsites%2Fde%2FJSP%2FJSP0011%2Edoc&action=view&source=https%3A%2F%2Fspexternal%2Emodot%2Emo%2Egov%2Fsites%2Fde%2FJSP%2FFor . This special provision specifies mowing the entire project limits, but if only specific areas are to be mowed, the designer needs to specify those locations in the special provision. Specific locations to be mowed and approximate number of mowings should be coordinated with district Maintenance.

Articles in "822 Roadside Vegetation Management"

The following 10 pages are in this category, out of 10 total.

Printable Version of EPG 822 Roadside Vegetation Management
Roadside Vegetation Management
(as of mid-2012)

EPG 822 presents the very latest guidance and this pdf file of EPG 822 through EPG 822.6 may be helpful for those wanting to easily print the Roadside Vegetation Management information.

Roadside Inventory, Environmental

Report 2005

(<http://library.modot.mo.gov/RDT/reports/Ri01007/or06005.pdf>)

Report 2004

(<http://library.modot.mo.gov/RDT/reports/Ri01007/Stat2004.pdf>)

See also: Innovation Library

(<http://www.modot.gov/services/OR/byDate.htm>)

- 822.1 Vegetation Management for Major Roads
- 822.2 Vegetation Management for Minor Roads
- 822.3 Vegetation Management for High Profile Areas
- 822.4 Best Practices
- 822.5 Recommended Practices
- 822.6 Definitions
- 822.7 Hay and Other Crops on the Right of Way
- 822.8 Maintenance Planning Guidelines for Mowing Operations
- 822.9 Maintenance Planning Guidelines for Brush Cutting
- 822.10 Maintenance Planning Guidelines for Tree Removal

Retrieved from "http://epg.modot.org/index.php?title=Category:822_Roadside_Vegetation_Management"

- This page was last modified on 12 May 2015, at 09:43.

171.7 Bridge Maintenance

From Engineering Policy Guide

Contents

- 1 BRG(A1) Utility Attachments to Bridges
- 2 BRG(A2) Levees
- 3 BRG(A3) High Water Marks
- 4 BRG(A4) Navigation Lights/Light Tenders
- 5 BRG(A5) Corps of Engineers Regulations
- 6 BRG(A6) Cathodic Protection
- 7 BRG(A7) Bridge Repairs Near, On or Over Railroad Right of Way
- 8 171.7.1 Bridge Maintenance
 - 8.1 BRG(B1) Bridge Inspections (Span Type and Culvert Type)
 - 8.2 BRG(B2) Bridge Maintenance (District)
 - 8.3 BRG(B3) Bridge Maintenance (Division)
- 9 171.7.2 Restriction
 - 9.1 BRG(C1) Posted Bridge Load Limits
 - 9.2 BRG(C2) Vertical Clearance
 - 9.3 BRG(C3) Temporary Clearances or Restrictions
 - 9.4 BRG(C4) Permits (Overdimension/Overweight)

BRG(A1) Utility Attachments to Bridges

Refer to EPG 643.3 Policy, Standards and Regulations concerning issuance of permits for utilities and EPG 643.3.16 General Guidelines for Bridge Attachments concerning the attachment of utilities to bridges. Failure of a utility to maintain the attachment to the bridge shall be reported to the District Utility Engineer.

BRG(A2) Levees

See DRN(B1) Levee Attachments and DRN(B2) Levee Fees and Taxes.

BRG(A3) High Water Marks

refer to EPG 748.2 Roadway Overtopping, High Water Marks concerning the requirements for marking high water marks during flood situations.

BRG(A4) Navigation Lights/Light Tenders

Refer to EPG 770.4 Navigation Lights/Light Tenders concerning navigation light maintenance and inspection.

BRG(A5) Corps of Engineers Regulations

Refer to DRN(C2) 404 Permits.

BRG(A6) Cathodic Protection

Refer to EPG 774.4 Maintenance Procedures concerning the maintenance of bridge deck with cathodic protection.

BRG(A7) Bridge Repairs Near, On or Over Railroad Right of Way

Refer to EPG 643.4.4.1 Railroad Crossing Safety concerning safety and notification requirements associated with bridge maintenance activities over or within 25 horizontal ft. of the centerline of an active railroad track.

171.7.1 Bridge Maintenance

BRG(B1) Bridge Inspections (Span Type and Culvert Type)

Refer to EPG 772 Bridge Inspections concerning the types of bridges to be inspected and the frequency of the inspections.

BRG(B2) Bridge Maintenance (District)

Refer to EPG 770.1 District Routine Maintenance and Special Crew Responsibilities for the Bridge Maintenance tasks district Maintenance personnel are responsible.

BRG(B3) Bridge Maintenance (Division)

Refer to EPG 770.2 Regional and Central Office Bridge Maintenance Crew Responsibilities for examples of bridge maintenance items the respective crews are responsible to perform.

171.7.2 Restriction

BRG(C1) Posted Bridge Load Limits

Refer to EPG 770.5 Posting of Bridge Limits for how load carrying capacities of bridges are to be posted.

BRG(C2) Vertical Clearance

Refer to EPG 760.4 Vertical Clearance concerning the legal height limits for vehicles and the responsibility for measuring and reporting vertical height clearances for roadway structures.

BRG(C3) Temporary Clearances or Restrictions

Refer to EPG 760.4.3 Measurement Requirements concerning the measurement, input and notification of other divisions regarding temporary vertical clearances and lane width restrictions due to construction or maintenance work.

BRG(C4) Permits (Overdimension/Overweight)

Rules and regulations on the movement of overdimension and/or overweight loads are established by the Commission and Chief Engineer based on State Statute and are on file with the Secretary of State. Permits for this movement may be obtained at Motor Carrier Services (<http://wwwi/intranet/mc/>) , by phone at 800-877-8499. Permits for overdimension loads and non-commercial building movement shall be issued by district office staff for

local customers. Permits for all other movement may be obtained at the district by allowing walk-in customers to fax Motor Carrier Services. A permit agent will issue the permit and fax it to the customer at the district office.

District staff should observe the movement of large overdimension and/or extra heavy overweight loads that may cause damage to MoDOT facilities or have a significant impact on traffic movement. Motor Carrier Services will provide copies of all permits issued to the district(s) involved for loads over 16 ft. 6 in. tall, 17 ft. 0 in. wide or 240,000 pounds. District staff should determine which loads are most critical for observance, based on the permitted route. If the permitted move is not made according to the provisions of the permit or any MoDOT facilities are damaged, a report shall be made to Motor Carrier Services.

When permitted loads are moved across more than one district, the original district should notify the next district of problems (if any) encountered with the movement in their area. If the movement was proper and no problems were encountered, it may not be necessary to observe that load in other districts. As part of the quality assurance program, it is recommended that at least 10 percent of the permits issued for larger dimensions and weights (listed above) be observed by district staff.

Reason for policy:

- RSMo 304.170 - 304.210 (State Laws (<http://www.moga.mo.gov/statutesearch/>)), Traffic Regulations as to width, height and length of vehicles - exceptions.

Effective Date: 6/1/99

Revision Dates:

Retrieved from "http://epg.modot.org/index.php?title=171.7_Bridge_Maintenance"

Category: 171 Maintenance Policy and Operations

- This page was last modified on 21 June 2012, at 08:46.

Category:133 Snow and Ice Control

From Engineering Policy Guide

This article is to be used by Maintenance and other MoDOT personnel to execute daily assignments and deal with external customers. Materials and equipment used in snow and ice control are addressed in this article.



Districts may use any safety sensitive personnel designated by the district engineer in emergency situations and as indicated by the particular emergency. Snow and ice control operations as well as the Operator's Guide for Anti-Icing are included in this article.

Snow Plowing Practices

Summary 2009

(<http://library.modot.mo.gov/RDT/reports/ad09077/orb09003.pdf>)

See also: Innovation Library

(<http://www.modot.gov/services/OR/byDate.htm>)

Related Information

Incident Response Plan and Emergency Response Management

MoDOT Snow Academy Official Guide, Participant's Manual

(<http://wwwi.dot.missouri/intranet/hr/hred/documents/MoDOTSnowAcademyparticipantbook.pdf>)
and Snow Academy Website (<http://wwwi.dot.missouri/intranet/hr/hred/roadeo.htm>)

Contents

- 1 Anti-Icing
- 2 Operational Closure
- 3 Intent
- 4 Winter Operations Communication Plan

Anti-Icing

Anti-icing is the snow and ice control practice of preventing snow or ice from bonding to the pavement. Anti-icing forms the basis of MoDOT's snow and ice control program. De-icing will be practiced if and when weather conditions render anti-icing activities ineffective.

Reason for policy: National research shows anti-icing to be the most cost effective snow and ice control program.

Effective Date: 6/1/99

Revision Dates: 6/17/03

Operational Closure

In the event a storm reaches an intensity that the continuation of operations would prove ineffective or would pose an undue safety risk for MoDOT personnel and/or the traveling public, snow and ice control activities should be shut down until weather conditions have improved. The district engineer or designee is responsible for making a closure decision. The MoDOT Emergency Operation Center (EOC) is to be notified of any such closure decision.

Reason for policy: Reserve department resources for when they can be used more effectively

Effective Date: 6/1/99

Revision Dates: 6/17/03, 10/14/05

Intent

Snow and ice control operations should begin as soon as weather conditions warrant and continue on a 24-hour per day basis until all objectives outlined in this policy are met and sustained. Refer to EPG 133.4 Snow and Ice Control Operations.

Reasons for policy: Meet customer needs and set statewide performance standards.

Effective Date: 6/1/99

Revision Dates: 6/17/03, 10/14/05, 12/01/06, 8/16/07, 9/01/10

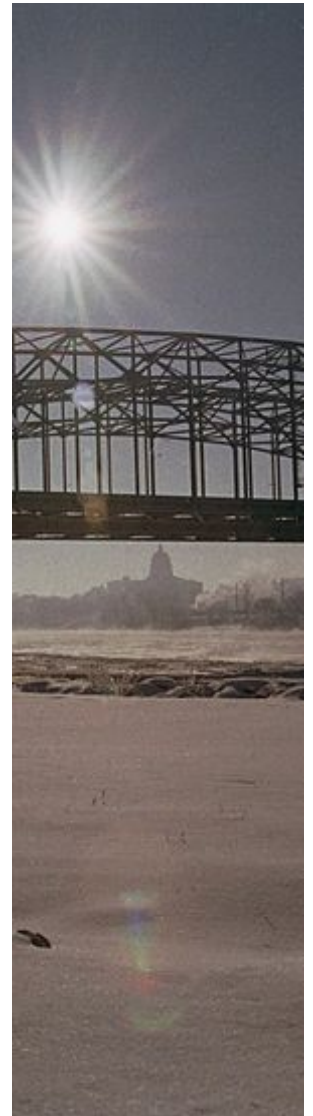
Winter Operations Communication Plan

Communication is critical to enhancing situational awareness during winter weather events. Communication between maintenance buildings, maintenance areas, districts and the central office is necessary to understand where the greatest needs are for resources during any particular event, but more so during major winter storms that affect a good portion of the state. Each district shall have a communication plan in place to disseminate information between the buildings, areas and district office.

The following guidelines shall be used to facilitate communication between districts and between districts and the central office before and during winter events.

- As storms begin in a district, that district shall contact the neighboring district in the direction that the storm is moving to inform them of the timing and intensity of the storm.

- Contact with neighboring districts after normal working hours, prior to the other district activating their EOC, can be made using the snowstorm contacts and phone numbers. Refer to http://wwwi/intranet/tr/emerg_response.htm for links to the Emergency Contact List, which is part of the Incident Response Plan (<http://wwwi/intranet/tr/irp/default.htm>) .
- During a storm, contact can be made using the other district's Emergency Operation Center (EOC) phone number or by contacting the neighboring Maintenance personnel directly.
- Each Maintenance manager (from Maintenance Supervisor on up) shall have a list of cell phone numbers and radio call numbers for all surrounding Maintenance managers, including those in neighboring districts, to coordinate continuity of route treatments between areas and districts.
- Each Maintenance manager whose area borders other states shall have a contact list for their counterparts in those bordering states to share storm information and, if possible, coordinate continuity of route treatments.
- Each district shall call the central office EOC phone number to announce activation and deactivation of the district EOC, and to notify the central office EOC of any incidents with statewide significance.
- Central office EOC will send updates to appropriate email distribution list(s) with district EOC activation/deactivation information, as well as any major incident information.
- Conference calls will be scheduled for all districts and the Central Office EOC (http://wwwi/intranet/tr/emerg_response.htm) at times designated by the Asst. Chief Engineer, State Maintenance Engineer and/or State Traffic Engineer.



Articles in "133 Snow and Ice Control"

The following 5 pages are in this category, out of 5 total.

1

- 133.1 Materials for Snow and Ice Control
- 133.2 Equipment for Snow and Ice Control
- 133.3 Snow and Ice Control Personnel
- 133.4 Snow and Ice Control Operations
- 133.5 Operator's Guide for Anti-Icing

Retrieved from "http://epg.modot.org/index.php?title=Category:133_Snow_and_Ice_Control"

- This page was last modified on 14 August 2012, at 08:20.

133.5 Operator’s Guide for Anti-Icing

From Engineering Policy Guide



Anti-icing is the snow and ice control practice of preventing the development of a bond between snow and/or ice and the pavement surface with the timely application of salt. Applying the right amount of salt at the right time will make snow removal operations more

efficient and produce safer driving conditions during winter storms.

This article provides guidelines for the application of salt to the roadway for a variety of winter storm conditions. The timing and application rates were developed under the SHRP/FHWA Research Program, in which MoDOT participated. Many Maintenance personnel who have tested these procedures have found them to be valuable in their winter maintenance operations. The statewide implementation of this technology will help produce safer driving conditions on MoDOT’s continuous operations routes during winter months.

Contents

- 1 133.5.1 Operations Guide for Maintenance Field Personnel
- 2 133.5.2 Glossary
- 3 133.5.3 Tables
 - 3.1 Table 133.5.3.1 How to Use Liquid Anti-Icers
 - 3.2 Table 133.5.3.2 Equivalent Salt Spread Rates
 - 3.3 Table 133.5.3.3 Pure salt concentration and corresponding specific gravity (measured by a hydrometer) at 59° F
 - 3.4 Table 133.5.3.4 Gradation of salt specified by ASTM D 632 & MoDOT
 - 3.5 Table 133.5.3.5 Proportions for preparing sodium chloride solution from commercial grade salt (i.e., up to 5 percent impurities)
 - 3.6 133.5.3.6 Tables for Continuous Operations Routes
 - 3.6.1 Table 133.5.3.6.1 Type 5 Winter Event: Frost, Flurries, Freezing Fog, Blowing Snow and Refreeze
 - 3.6.2 Table 133.5.3.6.2 Type 4 Winter Event: Dusting to 1 in. of snow, sleet, or other frozen precipitation
 - 3.6.3 Table 133.5.3.6.3 Type 3 Winter Event: 1 – 6 in. of snow/frozen precipitation in 24 hours OR a trace to 1/2 in. of ice
 - 3.6.4 Table 133.5.3.6.4 Type 2 Winter Event: 6 – 12 in. of snow in 24 hours OR 1/2 to 3/4 in. of ice

Tables	Printable pdf files
How to Use Liquid Anti-Icers	How to Use Liquid Anti-Icers
Equivalent Salt Spread Rates	Equivalent Salt Spread Rates
Pure salt concentration and corresponding specific gravity (measured by a hydrometer) at 59° F	Pure salt concentration and corresponding specific gravity (measured by a hydrometer) at 59° F
Gradation of salt specified by ASTM D 632 and MoDOT	Gradation of salt specified by ASTM D 632 and MoDOT
Proportions for preparing sodium chloride solution from commercial grade salt (i.e., up to 5 percent impurities)	Proportions for preparing sodium chloride solution from commercial grade salt (i.e., up to 5 percent impurities)
Type 5 Winter Event: Frost, Flurries, Freezing Fog, Blowing Snow and Refreeze	Type 5 Winter Event
Type 4 Winter Event: Dusting to 1 in. of snow, sleet, or other frozen precipitation	Type 4 Winter Event
Type 3 Winter Event: 1 – 6 in. of snow/frozen precipitation in 24 hours OR a trace to 1/2 in. of ice	Type 3 Winter Event
Type 2 Winter Event: 6 – 12 in. of snow in 24 hours OR 1/2 to 3/4 in. of ice	Type 2 Winter Event
Type 1 Winter	Type 1 Winter

- 3.6.5 Table 133.5.3.6.5 Type 1 Winter Event: More than 12 inches of snow in 24 hours OR more than $\frac{3}{4}$ inch of ice

Event: More than 12 inches of snow in 24 hours OR more than $\frac{3}{4}$ inch of ice	Event
---	-------

133.5.1 Operations Guide for Maintenance Field Personnel

This is a guide to highway anti-icing operations for Maintenance field personnel. Its purpose is to recommend maintenance actions for *preventing* the formation or development of packed and bonded snow or bonded ice on the **continuous operations routes** during a variety of winter weather events. It is intended to complement the decision-making and management practices of a systematic anti-icing program so that **continuous operations routes** can be efficiently maintained in the best possible condition.

These guidelines are based on the results of four years of anti-icing field testing conducted by 15 state DOTs, including MoDOT, and is supported by the Strategic Highway Research Program (SHRP) and the Federal Highway Administration (FHWA). Since then, it has been augmented with many additional years of anti-icing experience in different parts of our state.

Guidance for anti-icing operations during five winter weather events is available. The five events are:

- Type 5 Winter Event: Frost, flurries, freezing fog, blowing snow & refreeze
- Type 4 Winter Event: Dusting to 1 in. of snow, sleet or other frozen precipitation
- Type 3 Winter Event: 1 – 6 in. of snow/frozen precipitation in 24 hours OR a trace to $\frac{1}{2}$ in. of ice
- Type 2 Winter Event: 6 – 12 in. of snow in 24 hours OR $\frac{1}{2}$ to $\frac{3}{4}$ in. of ice
- Type 1 Winter Event: More than 12 in. of snow in 24 hours OR more than $\frac{3}{4}$ in. of ice

The tables suggest the appropriate maintenance action to take during initial and follow-up anti-icing operations for a given precipitation or

icing event. Each action is defined for a range of pavement temperatures and an associated temperature trend. For some events the operation is dependent not only on the pavement temperature and trend, but also upon the pavement surface or the traffic condition at the time of the action. Many of the maintenance actions involve the application of salt in either a dry solid, pre-wetted or brine (liquid) form. Pre-wetted solid and brine are the two primary forms on which we need to concentrate. Application rates are given for each form where appropriate. **These are suggested rates and should be adjusted, if necessary, to achieve the effectiveness for local conditions.**

Comments and notes are given in each table where appropriate to further guide field maintenance personnel for their anti-icing operations.

Related Information

MoDOT Snow Academy Official Guide, Participant's Manual
(<http://wwwi.dot.missouri/intranet/hr/hred/documents/MoDOTSnowAcademyparticipantbook.pdf>)
and Snow Academy Website (<http://wwwi.dot.missouri/intranet/hr/hred/roadeo.htm>)

133.5.2 Glossary

Black ice. Popular term for a very thin coating of clear, bubble-free, homogenous ice which forms on a pavement with a temperature at or slightly above 32° F when the temperature of the air in contact with the ground is below the freezing-point of water and small slightly supercooled water droplets deposit on the surface and coalesce (flow together) before freezing.

Brine. Water saturated with common salt (NaCl), also liquid salt or liquid chemical.

Continuous Operations Routes. This system includes all major highways (<http://sharepoint/systemdelivery/TP/sysanalysis/dmas/Shared%20Documents/Maps/MajorHighwaySystem2015.pdf>) , minor highways with traffic volumes of 2,500 ADT or greater and other urban and community routes designated by the district in consultation with the Maintenance Division. This also includes all designated incident bypass routes.

These routes will receive plowing and application of snow and ice control treatments on an as needed basis, throughout the storm until all lanes are restored to a near normal condition.

Dew Point. The temperature that a vapor begins to condense.

Freezing rain. Super-cooled droplets of liquid precipitation falling on a surface whose temperature is below or slightly above freezing, resulting in a hard, slick, generally thick coating of ice commonly called glaze or clear ice. Non-super-cooled raindrops falling on a surface whose temperature is well below freezing will also result in glaze.

Frost. Also called hoarfrost. Ice crystals in the form of scales, needles, feathers or fans deposited on surfaces cooled by radiation or by other processes. The deposit may be composed of drops of dew frozen after deposition and of ice formed directly from water vapor at a temperature below 0° C (32° F) (sublimation).

Light Snow. Snow falling at the rate of less than 1/2 in. per hour; visibility is not affected adversely.

Moderate or heavy snow. Snow falling at a rate of 1/2 in. per hour or greater; visibility may be reduced.

Pre-treatment. This is the practice of applying salt brine at 44 gallons per lane mile to dry pavement prior to the winter event, or the application of pre-wetted salt to the surface prior to snow and ice bonding to the pavement.

Pre-wetting. Pre-wetting is the practice of applying salt brine to dry salt before it is placed on the pavement, and should be done at 10 to 15 gallons per ton. Liquid calcium chloride may be used for pre-wetting salt at temperatures below 15° F.

Sleet. A mixture of rain and of snow that has been partially melted by falling through an atmosphere with a temperature slightly above freezing.

Slush. Accumulation of snow that lies on an impervious base and is saturated with water in excess of its freely drained capacity. It will not support any weight when stepped or driven on but will "squish" until the base support is reached.

Spread Rate. The salt application rate in either the solid or liquid form. For solid applications it is simply the weight of the salt applied per lane mile. For liquid applications it is the volume (gallons) of brine applied per lane mile.



133.5.3 Tables

Table 133.5.3.1 How to Use Liquid Anti-Icers

Pounds of Ice Melted per Pound of Salt

Temperature, ° F	One Pound of Salt (sodium chloride)
30	46.3 lbs. of ice
25	14.4 lbs. of ice
20	8.6 lbs. of ice
15	6.3 lbs. of ice
10	4.9 lbs. of ice
5	4.1 lbs. of ice
0	3.7 lbs. of ice

Printable pdf of "Equivalent Salt Spread Rates"

Table 133.5.3.2 Equivalent Salt Spread Rates

Solid or Pre-wetted Solid (lbs./lane-mile)	Salt Brine, 23% Concentration NaCl (gallon/lane-mile)
25	11
50	22
75	33
100	44
125	55
150	65
200	87

Printable pdf of "Pure salt concentration and corresponding specific gravity (measured by a hydrometer) at 59° F"

Table 133.5.3.3 Pure salt concentration and corresponding specific gravity (measured by a hydrometer) at 59° F

Percent salt	Specific gravity at 59° F	Percent of saturation	Weight ¹ of salt, lb/gal
0	1.000	0	0
5	1.035	20	0.43
6	1.043	24	0.52
7	1.050	28	0.61
8	1.057	32	0.71
9	1.065	36	0.80
10	1.072	40	0.90
11	1.080	44	0.99
12	1.087	48	1.00
13	1.095	52	1.10
14	1.103	56	1.29
15	1.111	60	1.39
16	1.118	63	1.49
17	1.126	67	1.60
18	1.134	71	1.71
19	1.142	75	1.81
20	1.150	79	1.92
21	1.158	83	2.03
22	1.166	87	2.14
23	1.175	91	2.26
24	1.183	95	2.37
25	1.191	99	2.45
25.2	1.200	100	

¹Note: Weight of commercial salt required = (weight of pure NaCl from table) ÷ (purity in percent)

Printable pdf of "Gradation of salt specified by ASTM D 632 and MoDOT"

Table 133.5.3.4 Gradation of salt specified by ASTM D 632 & MoDOT

Sieve size	Weight % passing		
	ASTM Gr. 1	ASTM Gr. 2	MoDOT
3/4 in.	-	100	-
1/2 in.	100	-	100
3/8 in.	95-100	-	95-100
No. 4	20-90	29-100	15-95
No. 8	10-60	10-60	5-65
No. 30	0-15	0-15	0-15
Note: ASTM Gr. 1 is the most commonly used gradation in the U.S.			

Printable pdf of "Proportions for preparing sodium chloride solution from commercial grade salt"

Table 133.5.3.5 Proportions for preparing sodium chloride solution from commercial grade salt (i.e., up to 5 percent impurities)

Actual %NaCl	Weight NaCl		Crystallization temperature, ° F	Weight per unit volume of solution, lb/gal
	per volume solution, lb/gal	per volume water, lb/gal		
10	0.9	0.8	20	8.95
15	1.4	1.3	12	9.28
20	1.9	1.7	0	9.6
23 ¹	2.3	1.9	-6	9.76
25	2.5	2.1	-16	10.3
¹ Note: This is the approximate eutectic composition, i.e., the composition that results in the lowest temperature at which a solution can exist while remaining completely liquid.				

133.5.3.6 Tables for Continuous Operations Routes

Printable file for "Type 5 Winter Event"

Table 133.5.3.6.1 Type 5 Winter Event: Frost, Flurries, Freezing Fog, Blowing Snow and Refreeze

Continuous Operations Routes

Pavement Temperature Range and Trend	Traffic Condition	Common Operations Routes						Comments
		Initial Operation		Subsequent Operations				
		Maintenance Action	Spread Rates		Maintenance Action	Spread Rates		
Pre-wetted	Brine (gal/lane-		Pre-wetted	Brine (gal/lane-				

			solid salt (lb/lane- mile)	mile)		solid salt (lb/lane- mile)	mile)	
Above 32° F, steady or rising	Any level	None, see comments	-	-	None, see comments	-	-	1) Monitor pavement temperature closely; begin treatment if starts to fall to 32°F and below and is at or below dew point.
28° F to 32° F, remaining in range or falling to 32° F or below, and equal to or below dew point	Traffic rate less than 100 vehicles per hr	Apply brine or pre-wetted solid salt	25-65	11-28	Reapply pre- wetted solid salt as needed	25-65	-	1) Monitor pavement closely; if pavement becomes wet or if thin ice forms, reapply salt at higher indicated rate.
	Traffic rate greater than 100 vehicles per hr	Apply brine or pre-wetted solid salt	25-65	11-28	Reapply brine pre- wetted solid salt as needed	25-65	11-28	2) Do not apply brine on ice so thick that the pavement cannot be seen.
20 to 28° F, remaining in range and equal to or below dew point	Any level	Apply brine or pre-wetted solid salt	65-130	28-57	Reapply brine pre- wetted solid salt as needed	65-130	28-57	1) Monitor pavement closely; if thin ice forms, reapply salt at higher indicated rate. 2) Applications will need to be more frequent at higher levels of condensation; if traffic volumes are not enough to disperse condensation, it may be necessary to increase frequency. 3) It is not advisable to apply a brine at the indicated spread rate when the pavement temperature drops below 20°F.
10° to 20° F, remaining in range and equal to or below dew point	Any level	Apply pre- wetted solid salt	130-200	-	Reapply pre- wetted solid salt as needed	130-200	-	1) Monitor pavement closely; if thin ice forms, reapply salt at higher indicated rate. 2) Applications will need to be more frequent at higher levels of condensation; if traffic volumes are not enough to disperse condensation, it may be necessary to increase frequency.
Below 0° F,	Any level	Apply	-	-	Apply	-	-	1) Monitor pavement

steady or falling		abrasives			abrasives as needed			<p>closely, salt will have limited melting power in this temperature range.</p> <p>2) Liquid calcium chloride may be used for pre-wetting salt/abrasive mix at colder temperatures.</p>
Notes: TIMING. 1) Conduct initial operation in advance of freezing. Apply brine up to 3 hr in advance. Use longer advance times in this range to effect drying when traffic volume is low. Apply pre-wetted solid salt 1 to 2 hr in advance. 2) In the absence of precipitation, brine at 33 gal/lane-mi has been successful in preventing bridge deck icing when placed up to 4 days before freezing on higher volume roads and 7 days before on lower volume roads.								

Table 133.5.3.6.2 Type 4 Winter Event: Dusting to 1 in. of snow, sleet, or other frozen precipitation

Printable file for "Type 4 Winter Event"

Continuous Operations Routes

Pavement Temperature Range and Trend	Initial Operation				Subsequent Operations			Comments
	Pavement surface at time of initial operation	Maintenance action	Salt spread rates		Maintenance action	Salt spread rates		
			Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)		Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)	
Above 32° F, steady or rising	Dry, wet, slush or light snow cover	None, see comments	-	-	None, see comments	-	-	1) Monitor pavement temperature closely for drops toward 32° F and below. 2) Treat icy patches if needed with pre-wetted solid salt at 100 lb/lane-mile; plow if needed.
Above 32° F, 32° F or below is imminent; ALSO 15 to 32° F, remaining in range	Dry	Apply brine or pre-wetted salt	100	44	Plow as needed, reapply liquid or solid chemical when needed	100	44	1) Applications will need to be more frequent at lower temperatures and higher snowfall rates 2) It is not advisable to apply a straight brine at the indicated spread rate when the pavement temperature drops below 20°F 3) Do not apply brine onto heavy snow accumulation or packed snow
	Wet, slush, or light snow cover	Apply liquid or solid salt	100	44				

0 to 15° F , remaining in range	Dry, wet, slush or light snow cover	Apply pre- wetted solid chemical	200	-	Plow as needed, reapply pre- wetted solid chemical when needed	200	-	1) Abrasives may be added to the salt to enhance traction at colder temperatures 2) Liquid calcium chloride may be used for pre-wetting solid salt at colder temperatures
Below 0° F , steady or falling	Dry or light snow cover	Plow as needed	-	-	Plow and apply salt/abrasive mix as needed	-	-	1) If pavement becomes slick apply salt/abrasive mix to enhance traction. Salt will have limited melting power in this temperature range. 2) Pre-wet salt/abrasive mix with liquid calcium chloride.

Notes: SALT APPLICATIONS. 1) Time initial and subsequent chemical applications to prevent deteriorating conditions or development of packed and bonded snow. 2) Apply salt ahead of traffic rush periods occurring during storm.

PLOWING. If needed, *plow before salt applications* so that excess snow, slush, or ice is removed and pavement is wet, slushy, or lightly snow covered when treated.

Table 133.5.3.6.3 Type 3 Winter Event: 1 – 6 in. of snow/frozen precipitation in 24 hours OR a trace to 1/2 in. of ice

Printable file for "Type 3
Winter Event"

Continuous Operations Routes

Pavement Temperature Range and Trend	Initial Operation				Subsequent Operations				Comments	
	Pavement surface at time of initial operation	Maintenance action	Salt spread rates		Maintenance action	Salt spread rates				
			Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)		Pre-wetted solid salt (lb/lane-mile)		Brine (gal/lane-mile)		
						Light snow	Heavier snow	Light snow		Heavier snow
Above 32° F, steady or rising	Dry, wet, slush or light snow cover	None, see comments	-	-	None, see comments	-	-	-	-	1) Monitor pavement temperature closely for drops toward 32° F and below. 2) Treat slick patches if needed with pre-wetted salt at 100 lb/lane-mile

										or brine 44 gal./lane-mile; plow if needed.
Above 32° F, 32° F or below is imminent; <i>ALSO 20 to 32° F</i> , remaining in range	Dry	Apply brine or pre-wetted salt	100	44	Plow as needed, reapply brine or pre-wetted solid salt when needed	100	200	44	88	1) Applications will need to be more frequent at lower temperatures and higher snowfall rates. 2) Do not apply brine onto heavy snow accumulation or packed snow. 3) After heavier snow periods and during light snowfall, reduce salt rate to 100 lb./lane-mile or 44 gal./lane-mile brine; continue to plow and apply salt as needed
	Wet, slush, or light snow cover	Apply brine or pre-wetted salt	100	44						
10 to 20° F, remaining in range	Dry, wet, slush or light snow cover	Apply pre-wetted salt	200	-	Plow as needed, reapply pre-wetted solid salt when needed	200	250	-	-	1) Reduce salt rate to 200 lb./lane-mile after heavier snow periods and during light snowfall; continue to plow and apply salt as needed. 2) Liquid calcium chloride may be used for

										pre-wetted salt at colder temperatures
Below 10° F, steady or falling	Dry or light snow cover	Plow as needed	-	-	Plow and apply salt/abrasive mix as needed	-	-	-	-	As pavement becomes slick, apply salt/abrasive mix to enhance traction. Salt will have limited melting power at these temperatures.

Notes: SALT APPLICATIONS. 1) Time initial and subsequent chemical applications to *prevent* deteriorating conditions or development of packed and bonded snow. 2) **Anticipate increases in snowfall intensity. Apply higher rate treatments prior to or at the beginning of heavier snowfall periods to prevent development of packed and bonded snow.** 3) Apply salt ahead of traffic rush periods occurring during storm.

PLOWING. If needed, *plow before salt applications* so that excess snow, slush or ice is removed and pavement is wet, slushy or lightly snow-covered when treated.

Table 133.5.3.6.4 Type 2 Winter Event: 6 – 12 in. of snow in 24 hours OR ½ to ¾ in. of ice

Printable file for "Type 2 Winter Event"

Continuous Operations Routes

Pavement Temperature Range and Trend	Initial Operation				Subsequent Operations			Comments
	Pavement surface at time of initial operation	Maintenance action	Salt spread rates		Maintenance action	Salt spread rates		
			Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)		Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)	
Above 32° F, steady or rising	Dry, wet, slush or light snow cover	None, see comments	-	-	None, see comments	-	-	1) Monitor pavement temperature closely for drops toward 32° F and below. 2) Treat slick patches if needed with pre-wetted solid salt at 100 lb/lane-mile or with brine at 44 gal/lane-mile; plow if needed.
Above 32° F, 32° F or below is imminent;	Dry	Apply brine or pre-wetted solid salt	100	44	Plow accumulation and reapply	100	44	1) If the desired plowing/treatment frequency cannot be maintained, the spread

ALSO 30 to 32° F, remaining in range	Wet, slush or light snow cover	Apply brine or pre-wetted solid salt	100	44	brine or solid salt as needed			rate can be increased to 200 lb/lane-mile to accommodate longer operational cycles. 2) Do not apply brine onto heavy snow accumulation or packed snow.
20 to 30° F, remaining in range	Dry	Apply brine or pre-wetted solid salt	150-200	65-87	Plow accumulation and reapply brine or solid salt as needed	200	87	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 400 lb/lane-mile to accommodate longer operational cycles. 2) Do not apply brine onto heavy snow accumulation or packed snow.
	Wet, slush or light snow cover	Apply brine or pre-wetted solid salt	150-200	65-87				
10 to 20° F, remaining in range	Dry, wet, slush or light snow cover	Apply pre-wetted solid salt	200	-	Plow accumulation and reapply brine or solid salt as needed	250	-	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 500 lb/lane-mile to accommodate longer operational cycles. 2) Liquid calcium chloride may be used for pre-wetting salt at colder temperatures.
Below 10° F, steady or falling	Dry or light snow cover	Plow as needed	-	-	Plow accumulation as needed	250	-	As pavement becomes slick, apply salt/abrasive mix to enhance traction. Salt will have limited melting power in this temperature range.

Notes. SALT APPLICATIONS. 1) Time initial and subsequent salt applications to *prevent* deteriorating conditions or development of packed and bonded snow – ***timing and frequency of applications will be determined primarily by plowing requirements.*** 2) Apply salt ahead of traffic rush periods occurring during storm.

PLOWING. *Plow before chemical applications* so that excess snow, slush or ice is removed and pavement is wet, slushy, or lightly snow-covered when treated.

Table 133.5.3.6.5 Type 1 Winter Event: More than 12 inches of snow in 24 hours OR more than ¾ inch of ice

Printable file for "Type 1 Winter Event"

Continuous Operations Routes

Pavement Temperature Range and Trend	Initial Operation				Subsequent Operations			Comments
	Pavement surface at time of initial operation	Maintenance action	Salt spread rates		Maintenance action	Salt spread rates		
			Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)		Pre-wetted solid salt (lb/lane-mile)	Brine (gal/lane-mile)	
Above 32° F, steady or rising	Dry, wet slush or light snow cover	None, see comments	-	-	None, see comments	-	-	1) Monitor pavement temperature closely for drops toward 32° F and below 2) Treat slick patches if needed with pre-wetted salt at 100 lb/lane-mi or with brine at 44 gal/ln-mi; plow if needed.
Above 32° F, 32° F or below is imminent; ALSO 30 to 32° F, remaining in range	Dry	Apply brine or pre-wetted solid salt	100	44	Plow accumulation and reapply brine or solid salt as needed	100	44	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 200 lb/lane-mi to accommodate longer operational cycles. 2) Do not apply brine onto heavy snow accumulation or packed snow.
	Wet, slush, or light snow cover	Apply brine or pre-wetted solid salt	100	44				
20 to 30° F, remaining in range	Dry	Apply brine or pre-wetted solid salt	150-200	65-87	Plow accumulation and reapply brine or solid salt as needed	200	87	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 400 lb/lane-mi to accommodate longer operational cycles. 2) Do not apply brine onto heavy snow accumulation or packed snow.
	Wet, slush, or light snow cover	Apply brine or pre-wetted solid salt	150-200	65-87				
10 to 20° F, remaining in range	Dry, wet, slush, or light snow cover	Apply pre-wetted solid salt	200	-	Plow accumulation and reapply brine or solid salt as needed	250	-	1) If the desired plowing/treatment frequency cannot be maintained, the spread rate can be increased to 500 lb/lane-mi to accommodate longer operational cycles.

								2) Liquid calcium chloride may be used for pre-wetting salt at colder temperatures
Below 10° F, steady or falling	Dry or light snow cover	Plow as needed	-	-	Plow accumulation as needed	250	-	As pavement becomes slick apply salt/abrasive mix to enhance traction. Salt will have limited melting power in this temperature range.
<p>Notes: SALT APPLICATIONS. 1) Time initial and subsequent salt applications to prevent deteriorating conditions or development of packed and bonded snow--<i>timing and frequency of subsequent applications will be determined primarily by plowing requirements.</i> 2) Apply salt ahead of traffic rush periods occurring during storm.</p> <p>PLOWING. <i>Plow before chemical applications</i> so that excess snow, slush or ice is removed and pavement is wet, slushy or lightly snow covered when treated.</p>								

Retrieved from "http://epg.modot.org/index.php?title=133.5_Operator%E2%80%99s_Guide_for_Anti-Icing"
Category: 133 Snow and Ice Control

- This page was last modified on 14 May 2015, at 15:28.

ANNEX C



HAZARDOUS MATERIALS RESPONSE PLAN

The following MoDOT policies relate to this plan:

[Hazard Communication Training Policy](#)

And

[Hazard Spills Training Policy](#)

TABLE OF CONTENTS

	<u>Page</u>
I. Hazardous Materials Reporting Procedures	5
A. Hazardous Substance Release Emergency Definition	5
B. Emergency Communications Procedures	5
C. Emergency Procedures for Spills and Releases	6
D. Response to Release on R/W (Non-MoDOT Operations)	7
E. Keeping a Log of Hazardous Spills Incidents	7
F. Procedures – Discovery of Non-MoDOT Hazardous Materials ..	8
II. MoDOT’s Hazard Communication Plan	10
A. Safety Data Sheets	11
B. Container Labeling	11
C. Non-Routine Tasks	12
D. Non-Department Personnel (Contractors, etc.)	12
E. Employee Training	13

HAZARDOUS MATERIALS PROCEDURES

These procedures are intended for Haz-Mat Responders or Maintenance Supervisors. The procedures are as follows:

1. A hazardous materials spill is considered an emergency situation. Remember to approach the scene cautiously.
2. Secure the scene, if it is not already. Use your eyes and the [*Emergency Response Guidebook*](#)¹ to attempt to identify the hazards. Stay upwind of the vehicle, containers or spill and do not walk into, touch or inhale any spilled material.
3. Contact the appropriate local authorities: MDNR, fire, police, ambulance, etc.
4. Remember, MoDOT is not in the business of cleaning up hazardous spills. If the spill is close to a stream or waterway, and you can positively identify the spilled material, and it can be done without jeopardizing anyone, build a dike or dam to contain the spilled material. Use the [*National Institute of Occupational Safety and Health \(NIOSH\) Pocket Guide*](#)² and the Emergency Response Guidebook to identify the specific chemical hazards if possible.
5. Contact the MO Department of Natural Resources' Environmental Emergency Response Unit (MDNR) **24-hour emergency hotline (573) 634-2436**. MDNR will inform the Local Emergency Planning Committee (LEPC). Have information regarding the spill ready such as the location, company, material, amount, etc.
6. **Cleanup is the responsibility of the owner/operator** of the transportation unit. If the driver is injured or unable to contact a cleanup company, contact MDNR with the information and they will contact a cleanup company.
7. If the material spilled is petroleum and **less than 50 gallons**, the owner/operator may not have to clean it up, but we do recommend aerating the soil at a minimum. As a courtesy, MoDOT will contact MDNR and notify them of the spill.
8. If the material spilled is petroleum and **over 50 gallons**, it is mandatory that the owner/operator of the transportation unit contact MDNR and also inform the owner/operator that we expect them to clean up the spill in accordance with state and federal regulations. MoDOT shall contact MDNR as a courtesy and insure the owner/operator has made his contact.
9. Missouri Law requires any petroleum product spill/release to the environment in **excess of 50 gallons** or **any quantity entering a water body** be reported to the Missouri Department of Natural Resources and the National Response Center.

¹ Active Line Information

Link Name: *Emergency Response Guidebook*

Description: a guide to aid first responders in quickly identifying specific or generic hazards of materials involved in an incident

Location: Public Internet (<http://hazmat.dot.gov/pubs/erg/erg2004.pdf>)

Who maintains this document: US Department of Transportation

² Active Line Information

Link Name: *National Institute of Occupational Safety and Health (NIOSH) Pocket Guide*

Description: a source of general industrial hygiene information on several hundred chemicals/classes for workers, employers, and occupational health professionals.

Location: Public Internet (<http://www.cdc.gov/niosh/npg/>)

Who maintains this document: National Institute of Occupational Safety and Health (NIOSH)

MDNR has a list of available cleanup companies. If the transportation unit needs to contact a cleanup company, they should call MDNR for a list.

10. Keep the District Hazardous Materials Coordinator, or their back up, informed of the situation. They will inform the districts assigned Environmental Specialist and/or Environmental Compliance Manager in Design-Environmental Section.

Hazardous Material Reporting Procedures

A. Introduction

MoDOT has the responsibility of maintaining a safe and usable highway system. MoDOT employees, however, have not been trained in non-department hazardous waste identification, investigation, and/or removal. It is MoDOT's policy to take all reasonable precautions to protect both its employees and the public from being exposed to unidentifiable materials or to identify materials that may be dangerous to health, safety, or the environment. For these reasons, the following emergency procedures emphasize rapid communications with the Department of Natural Resources (DNR) and other emergency service agencies.

B. Definition of Hazardous Substance Release Emergency

A release of a hazardous or suspected hazardous material or waste non-owned by the department that requires initiation of the Emergency Communications Procedures for Hazardous Substance Release (*Section C below*) is one or more of the following incidents:

- Spill of an unidentified material on highway right of way (ROW);
- Spill of an identified hazardous material or waste on ROW.
- Abandoned containers of unidentified materials on ROW.
- Abandoned containers of identified hazardous material or waste on ROW.

C. Emergency Communications Procedures for Hazardous Substance Release

During normal working hours, the first department employee to discover a hazardous material release shall immediately radio or call the information to the Hazardous Materials Coordinator. If a hazardous material release results in injuries and/or a traffic control problem, the HMC should first contact the local authorities (highway patrol, sheriffs' department, fire department, local police, etc.).

During nonworking hours, any department employee discovering a hazardous material release that results in injuries and/or a traffic control problem, should first contact the local authorities (highway patrol, sheriffs' department, fire department, local police, etc.), then contact the HMC. If injuries and a traffic control problem do not exist, they should contact the HMC first.

A HMC backup list developed by the district should be available when the HMC is not available. When the HMC has been informed, the following steps are to be followed:

1. HMC will call the DNR 24-hour hotline number (573) 634-2436.
2. DNR will inform the appropriate Local Emergency Planning Committee, and will advise the HMC of cleanup instructions, if any.

3. DNR will inform the Highway Patrol, police, sheriff's department, and fire department when necessary except in accidents that incur injuries or traffic control problems. With these types of accidents, these contacts should already be done as previously mentioned.
4. HMC will inform the field personnel of any necessary actions.
5. HMC will call the assigned Sr. Environmental Specialist/Environmental Compliance Manager.

Without risking exposure to the substance, the discoverer shall secure the sight to keep unnecessary people away and then provide all available information about the risk to the HMC for relay to the DNR and the Office of Risk Management. Other previously mentioned agencies will be informed by DNR, unless already informed in the case of accidents that have injuries or traffic control problems. This information, as a minimum, should include the following:

- Location
- Estimated quantity of spill
- Type of materials
- Phone number or radio call number where the discoverer can be contacted.
- Written notes of activity, time of occurrences, and names of those involved.

The discoverer shall remain at the site at a safe distance on a standby basis to provide communications until relieved by the HMC or his/her designee. The discoverer and/or the HMC shall be prepared to respond to requests from DNR, local authorities, etc., for additional information.

If or when a **NEWS PERSON** contacts the discoverer, be factual in your statements and any answers you provide. "I don't know" is not a demeaning answer and should be used when it is an accurate statement or answer. Suspicion or guessing on the discoverer's part could lead to unnecessary hysteria.

D. Emergency Procedures for Spills and Releases.

Follow Spill Prevention and Control Countermeasures (SPCC) Plan requirements in storage and training for all MoDOT hazardous materials and petroleum products. To ensure worker safety in the event of a spill or other unplanned release of a hazardous material or waste, the following steps are to be taken by MoDOT employees:

1. Do not walk into, touch, taste, or inhale the spilled material or disturb hazardous material containers. Stay upwind and upgrade of any spilled material, fumes or dust.

2. Eliminate all ignition sources (flares, operating engines, smoking, electrical sparks).
3. Stay clear of the ends of any tanks or probable points of rupture.
4. Do not assume that gases or vapors are harmless because of a lack of odor.
5. Avoid confined spaces near the spill or release.
6. Secure the area.

E. Response to Release Emergencies on Right Of Way Resulting From Non-department Operations

MoDOT is not in the business of containing and cleaning up hazardous substance releases caused by private carriers on highway right of way. Any MoDOT employee that discovers a release on the ROW shall follow this procedure:

1. Immediately initiate the Emergency Communications Procedure for Hazardous Substance Release (*Section C above*).
2. Stand by the field communications equipment, if available, to give information to the HMC, DNR, and the local authorities until relieved by DNR or the HMC.
3. After the incident scene is cleared of traffic and bystanders, other MoDOT employees may attempt to block the flow of hazardous or unknown substance down the drainage way when informed by DNR. If MoDOT personnel can positively identify the hazardous material and blocking drainage ways can be done without jeopardy to any people, the drainage way can be blocked. For odorless and colorless volatile materials, it is important to determine the extent of dangerous contamination in the field, without appropriate equipment and skills.

MoDOT employees shall not participate in the cleanup and handling of hazardous materials and wastes owned by a private business, unless directed to do so by the HMC upon direction of the assigned Environmental Specialist/Environmental Manager.

F. Responsibilities for Keeping A Log of Hazardous Spills Incidents

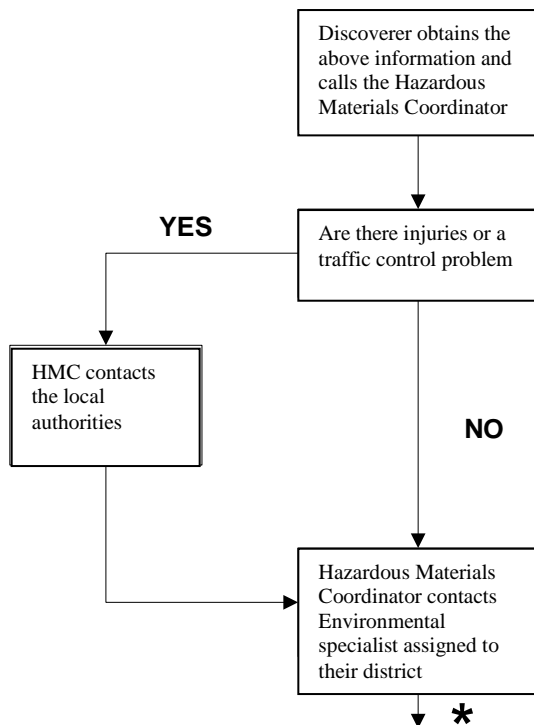
The HMC is responsible for keeping a log of hazardous spill incidents and reporting those incidents to Central Office Design-Environmental Section on a quarterly basis.

Procedures to Follow When Discovering Non-Department Hazardous Materials

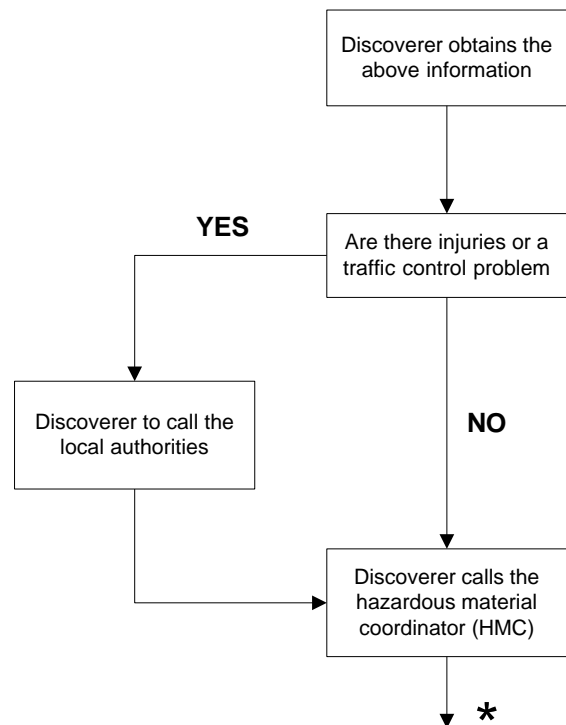
First, the discoverer will need to obtain the following information:

- Are there injuries or a traffic control problem?
- The location.
- Location of any waterways in near proximity to the hazardous material.
- Estimated quantity of spill.
- Type of hazardous material
- Phone number or radio call number where the discoverer can be contacted.

During Working Hours:



During Non-Working Hours:



*** Duties of the HMC:**

1. HMC will call the DNR 24-hour hotline number (573) 634-2436.
2. DNR will inform the appropriate Local Emergency Planning Committee, and will advise the HMC of clean up instructions, if any.
3. DNR will inform the local authorities when necessary, except in accidents with injuries or traffic control problems. With these types of accidents, these contacts should be previously done.
4. HMC will inform field personnel of any necessary actions.
5. HMC will call the assigned Environmental Specialist/ Environmental Compliance Manager.

**FOR ADDITIONAL INFORMATION, CONTACT THE DISTRICT
HAZARDOUS MATERIAL COORDINATOR (HMC).**

DISTRICT HAZARDOUS MATERIALS COORDINATORS

NW District –	Matthew Sonnor, S&H Manager.....(816) 387-2471; Cell (816) 262-1141 Lee Bearce, Sr. Safety Officer.....(816) 387-2467; Cell (816) 271-6936
NE District -	Shari Dye, S&S Manager.....(660) 385-8258; Cell (660) 651-0588 David Taylor, Int Safety Officer.....(660) 385-8254; Cell (660) 346-8370 Jennifer Henson, Dist M&T Eng.....Cell (573) 406-8023
KC District -	Marcus Slaughter, Incident MGT.....(816) 247-2055; Cell (816) 863-7822 Eric Ramsey, S&H Manager.....(816) 607-2048; Cell (816) 288-0241
Central District -	Chris Engelbrecht, S&H Manager.....(573) 751-6549; Cell (573) 690-2932 Brice Simmons, Safety Officer.....Cell (573) 230-9899
SL District -	Owen Hasson, Incident MGT.....(314) 275-1535; Cell (314) 565-9902 Mike Foppe, Maint. Super.....(314) 453-1762; Cell (314) 713-6203
SW District -	Gary McLarry, S&H Manager.....(417) 895-7618; Cell (417) 766-3856 Doug Foley, Safety Officer.....(417) 895- 7647; Cell (417) 529-2159
SE District -	Enos Criddle, S&H Manager.....(573) 472-5263; Cell (573) 380-5582 Amy Bryant, Sr Pave Spec.....(417) 469-6251; Cell (417) 252-4454

DISTRICT CUSTOMER SERVICE OPERATORS

NW District - St. Joseph	(816) 387-2350
NE District - Hannibal	(573) 248-2490
KC District - Kansas City	(816) 607-2000
Central District - Jefferson City	(573) 751-3322
SL District - Chesterfield	(314) 275-1500
SW District - Springfield	(417) 895-7600
SE District - Sikeston	(573) 472-5333
Central Office.....	(573) 751-2551

HIGHWAY PATROL

General Headquarters	(573) 751-3313
Troop A	(816) 622-0800
Troop B	(816) 660-2123
Troop C	(314) 340-4000
Troop D	(417) 895-6868
Troop E.....	(573) 840-9500
Troop F.....	(573) 751-1000
Troop G	(417) 469-3121
Troop H	(816) 387-2345
Troop I.....	(573) 368-2345

DISTRICT HAZARDOUS MATERIALS COORDINATORS

MoDOT'S Hazard Communication Plan

I. PURPOSE

MoDOT includes some operations that use chemical substances that can be harmful, unless precautions are taken. This written Hazard Communication Plan is intended to serve as a guideline for all Districts and Central Office in developing an adequate means of informing and protecting employees. Its goal is to ensure protection of all employees involved in the handling and use of hazardous chemicals.

The effectiveness of this program depends upon the sincere support and cooperation of all those involved.

II. POLICY STATEMENT

All MoDOT employees exposed to hazardous chemicals shall be trained as outlined in this Hazard Communication Plan. It shall be the policy of MoDOT to maintain awareness of all hazardous chemicals encountered by its employees and to communicate any associated hazards along with the necessary safety precautions.

III. PRINCIPAL REQUIREMENTS OF THE HAZARD COMMUNICATION STANDARD

- A. Ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the identity of the chemical and appropriate hazard warning. Gas cans used for other substances must be properly labeled as such.
- B. Maintain copies of Safety Data Sheets (SDSs) for each hazardous chemical in the workplace, and ensure that the SDSs are readily accessible to employees.
- C. Provide employees with specific information regarding hazardous chemicals in their work areas at the time of their initial assignment, and whenever a new hazard is introduced into their work area. Employees must be informed of any operations in their work area where hazardous chemicals are present, and the location and ability of the written hazard communication plan and the SDSs.

- D. Provide employees with training regarding hazardous chemicals in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area. This training must include at least:
- Methods and observations that may be used to detect the presence of a chemical in the work area.
 - The physical and health hazards of the chemicals in the work area.
 - The measures employees can take to protect themselves from those hazards.
 - The details of the hazard communication plan, including an explanation of the SDSs, the labeling system, and the methods for employees to obtain and use the appropriate hazards information.

IV. SAFETY DATA SHEETS (SDS)

A. *Obtaining SDSs:*

A Safety Data Sheet is required for each hazardous chemical on the building inventory. Chemical manufacturers and suppliers are required to provide a SDS for each chemical provided to a customer. The storeroom will provide SDSs for all chemicals that they provide. For other products received directly from manufacturers or districts, SDSs should be provided by the manufacturer or distributor.

B. *Maintaining SDSs:*

SDSs, a copy of the written Hazard Communication Plan, and a list of hazardous chemicals in the workplace are to be maintained in a file, folder or notebook at each permanent workplace, at a location convenient and readily accessible to all employees during all work hours.

C. *Updating SDSs:*

Supervisors or their designees shall review incoming SDS, and copies of updated SDSs shall be forwarded to affected buildings. If the SDS has not been revised, the SDS may be discarded. If the SDS has been reviewed, the new SDS must be placed in the file and the old SDS removed. The date of removal shall be written on the old SDS and it shall be placed in a file labeled Old Safety Data Sheets.

V. CONTAINER LABELING

A. *Incoming Containers:*

Under the standard, chemical manufacturers and suppliers are responsible for labeling containers of hazardous chemicals. It is the responsibility of the supervisor, or designee, in each building, to ensure that each container arriving at the building is labeled or marked legibly with the following information:

- Identify (can be any chemical or common name for the agent as long as the term used is the same shown in the Department's list of hazardous chemicals and the SDSs.)
- Appropriate hazard warnings.
- Name and address of the chemical manufacturer, supplier, or other responsible party.

B. *Workplace Containers:*

Hazardous chemicals, which are dispensed from the original shipping container, must be dispensed into appropriate containers with the chemical identity and the hazard warning affixed. Any further dispensing must be into similarly labeled containers ultimately to the point of final use.

Exceptions:

- Chemicals to be used exclusively by one employee during one work shift may be transferred to and used from unlabeled containers.
- Laboratory chemicals dispensed from a properly labeled incoming container need to be identified by name only when dispensing for use in the laboratory.

C. *Updating of Labels:*

If MoDOT is notified of significant hazard characteristic changes on an updated SDS, the supervisor, or designee, responsible for container labeling, shall see that any outdated hazard warnings on labels are corrected and the updated information conveyed.

VI. NON-ROUTINE TASKS

- A. Circumstances may require employees to perform tasks that involve potential exposure to hazardous chemicals that are not in the course of the regular job.

Prior to these tasks, employees must be notified regarding:

- The nature of any hazardous chemicals present. Safety Data Sheets for those chemicals should be reviewed in detail and all recommendations followed in preparing for the task.
- Precautionary measures and personal protective equipment needed for the task.
- Any hazards associated with chemicals present in unlabeled pipes.

VII. NON-DEPARTMENTAL PERSONNEL (Contractors, etc.)

- A. Mutual conveyance of chemical hazard information is necessary between MoDOT and outside contractors and service personnel:
 - MoDOT must be informed of all hazardous substances to be brought into the workplace by contractors and/or service personnel.
 - Contractors and/or service personnel must be informed of all hazardous substances they may encounter during their activities in a MoDOT workplace.
- B. It is the responsibility of MoDOT to inform its employees and provide any necessary training to deal with chemical hazards brought into the workplace. Likewise, it is a responsibility of MoDOT to provide contractors and/or service personnel adequate information on chemical hazards within the workplace, so that contractors may inform and provide their employees with any necessary training.

In dealing with contractors, the following information shall be exchanged:

- A list of hazardous chemicals, which they may be exposed to while on the job site.
- Precautions that employees may take to lessen the possibility of exposure.
- The location of Safety Data Sheets (which must be immediately available).

VIII. EMPLOYEE TRAINING

- A. All MoDOT employees are required to receive initial Hazard Communication training. Employees who are or may be exposed to hazardous chemicals in the workplace shall receive additional training on chemical hazards (not necessarily each chemical). New employees shall be trained as soon as possible after hiring and before they are assigned to work with hazardous chemicals.
- B. Initial Hazard Communication training shall consist of a brief discussion of all sections of this Hazard Communication Plan and viewing of a Hazard Communication Video.
- C. Additional training shall be conducted by supervisors on specific chemical hazards in each workplace and when a new hazard, not necessarily a new chemical, is introduced into the work area.
- D. Documented records of training shall be maintained.
- E. Follow-up shall be conducted by supervisors to insure that:
 - Affected employees remain aware of the Hazard Communication Standard and its requirements
 - Employees can show where the Safety Data Sheets are located

- Employees are generally familiar with the hazardous properties of the chemicals in their work area and the protective measures being implemented
- F. Additional training is Hazardous Material Identification is available for all employees that work or travel the highways. This training consists of a four-hour class to aid employees in recognizing a hazardous material and what response needs to be taken. Contact Design-Environmental Section in Central Office for additional information.

